ICOM®

SERVICE MANUAL

UHF TRANSCEIVERS

IC-F24
IC-F24S
IC-F25
IC-F25S

Icom Inc.

INTRODUCTION

This service manual describes the latest service information for the **IC-F24/IC-F24S/IC-F25/IC-F25S** UHF TRANSCEIVER at the time of publication.

MODEL	VERSION	SYMBOL	CH	FREQUENCY
IC–F24	USA–02	US2	16	400–470 MHz
	USA–03	US3	16	450–512 MHz
	GEN–02	GE2	16	450–470 MHz
	GEN–03	GE3	16	450–520 MHz
IC–F24S	USA–02	US2S	2	400–470 MHz
	USA–03	US3S	2	450–512 MHz
	GEN–02	GE2	2	400–470 MHz
	GEN–03	GE3	2	450–520 MHz
IC–F25	EUR–02	EU2	16	400–470 MHz
IC–F25S	EUR–02	EU2S	2	400–470 MHz

To upgrade quality, all electrical or mechanical parts and internal circuits are subject to change without notice or obligation.

DANGER

NEVER connect the transceiver to an AC outlet or to a DC power supply that uses more than 8 V. Such a connection could cause a fire or electric hazard.

DO NOT expose the transceiver to rain, snow or any liquids.

DO NOT reverse the polarities of the power supply when connecting the transceiver.

DO NOT apply an RF signal of more than 20 dBm (100mW) to the antenna connector. This could damage the transceiver's front end.

ORDERING PARTS

Be sure to include the following four points when ordering replacement parts:

1. 10-digit order numbers
2. Component part number and name
3. Equipment model name and unit name
4. Quantity required

<SAMPLE ORDER>

2260002840 Switch	SKHLLFA010	IC-F24	Main unit	5 pieces
8930063350 Lens	2775 Lens	IC-F24	Chassis	10 pieces

Addresses are provided on the inside back cover for your convenience.

REPAIR NOTES

1. Make sure the problem is internal before disassembling the transceiver.
2. **DO NOT** open the transceiver until the transceiver is disconnected from its power source.
3. **DO NOT** force any of the variable components. Turn them slowly and smoothly.
4. **DO NOT** short any circuits or electronic parts. An insulated turning tool **MUST** be used for all adjustments.
5. **DO NOT** keep power ON for a long time when the transceiver is defective.
6. **DO NOT** transmit power into a signal generator or a sweep generator.
7. **ALWAYS** connect a 30 dB to 40 dB attenuator between the transceiver and a deviation meter or spectrum analyzer when using such test equipment.
8. **READ** the instructions of test equipment thoroughly before connecting equipment to the transceiver.

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SECTION 1 SPECIFICATIONS

■ GENERAL

• Frequency coverage : 400–470 MHz [USA–02], [GEN–02], [EUR]
450–512 MHz [USA–03]
450–520 MHz [GEN–03]

• Type of emission :

VERSION	WIDE	MIDDLE	NARROW
[USA], [GEN]	16K0F3E (25.0 kHz)	N/A	11K0F3E (12.5 kHz)
[EUR]		14K0F3E (20.0 kHz)	8K50F3E (12.5 kHz)

• Number of conventional channels : 2 ch (IC-F24S/F25S), 16 ch (IC-F24/F25)
• Antenna impedance : 50 Ω (nominal)
• Operating temperature range : –30˚C to +60˚C (–22˚F to +140˚F) [USA], [GEN]
–25˚C to +55˚C [EUR]
• Power supply requirement : 7.2 V DC nominal (negative ground)
• Current drain (at 7.2 V DC ; approx.) :

RECEIVING		TRANSMITTING	
Stand-by	Max. audio	High (at 4 W)	Low (at 1 W)
75 mA	300 mA	1.6 A	0.8 A

• Dimensions (projections not included) : 53(W)×120(H)×38(D) mm; 2 3/32(W)×4 23/32(H)×1 1/2(D) in
• Weight (Including BP-231) : Approximately 260 g (9 3/16 oz)

■ TRANSMITTER

• Output power (at 7.2 V DC) : 4 W
• Modulation : Variable reactance frequency modulation
• Maximum permissible deviation : ±5.0 kHz (Wide), ±4.0 kHz (Middle), ±2.5 kHz (Narrow)
• Frequency error : ±2.5 ppm
• Spurious emissions : 70 dB (min.) [USA], [GEN]
0.25 µW (≤1 GHz), 1.0 µW (>1 GHz) [EUR]
• Adjacent channel power : 70 dB min. (75 dB typical) for Wide
70 dB min. (73 dB typical) for Middle
60 dB min. (68 dB typical) for Narrow
• Audio harmonic distortion : 3% typical (1 kHz, 40% deviation)
• Hum and Noise ([USA], [GEN]) (without CCITT filter) : 40 dB min. (46 dB typical) for Wide
34 dB min. (40 dB typical) for Narrow
• Residual modulation ([EUR] only) (with CCITT filter) : 45 dB min. (55 dB typical) for Wide
43 dB min. (53 dB typical) for Middle
40 dB min. (50 dB typical) for Narrow
• Limiting charact of modulator : 60–100% of maximum deviation
• Microphone impedance : 2.2 kΩ

■ RECEIVER

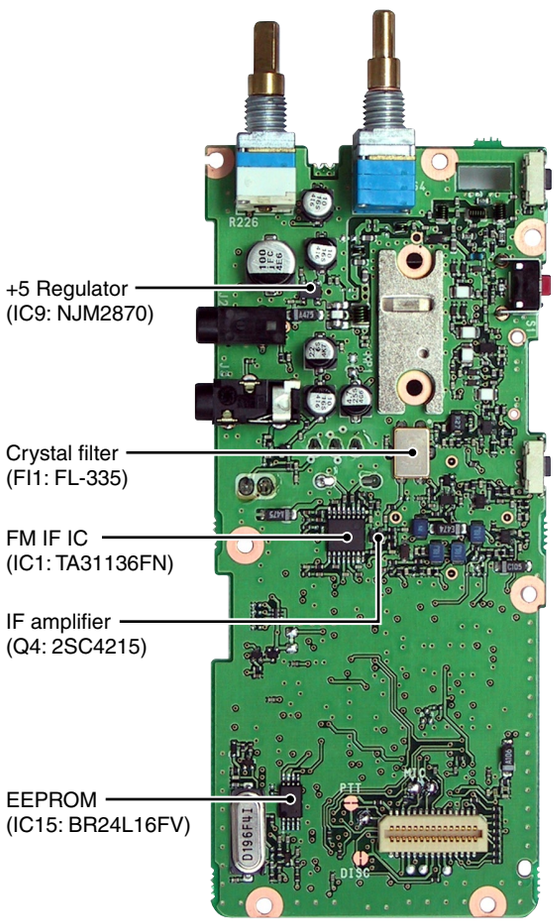
• Receive system : Double conversion superheterodyne system
• Intermediate frequencies : 1st IF: 46.35 MHz, 2nd IF: 450 kHz
• Sensitivity : 0.25 µV (–119 dBm) typical at 12 dB SINAD [USA], [GEN]
–4 dBµV (–111 dBm) emf typical at 20 dB SINAD [EUR]
• Squelch sensitivity (at threshold) : 0.25 µV typical [USA], [GEN]
–4 dBµV emf typical [EUR]
• Adjacent channel selectivity : 70 dB min. (75 dB typical) for Wide
70 dB min. (73 dB typical) for Middle
60 dB min. (65 dB typical) for Narrow
• Spurious response : 70 dB min.
• Intermodulation rejection ratio : 70 dB min. (74 dB typical) [USA], [GEN]
65 dB min. (67 dB typical) [EUR]
• Hum and Noise ([USA], [GEN] only) (without CCITT filter) : 40 dB min. (45 dB typical) for Wide
34 dB min. (40 dB typical) for Narrow
• Hum and Noise ([EUR] only) (with CCITT filter) : 45 dB min. (55 dB typical) for Wide
43 dB min. (53 dB typical) for Middle
40 dB min. (50 dB typical) for Narrow
• Audio output power : 0.5 W typical at 5% distortion with an 8 Ω load
• Output impedance (Audio) : 8 Ω

Specifications are measured in accordance with EIA-152-C/204D, TIA-603 or EN 300 086.
All stated specifications are subject to change without notice or obligation.

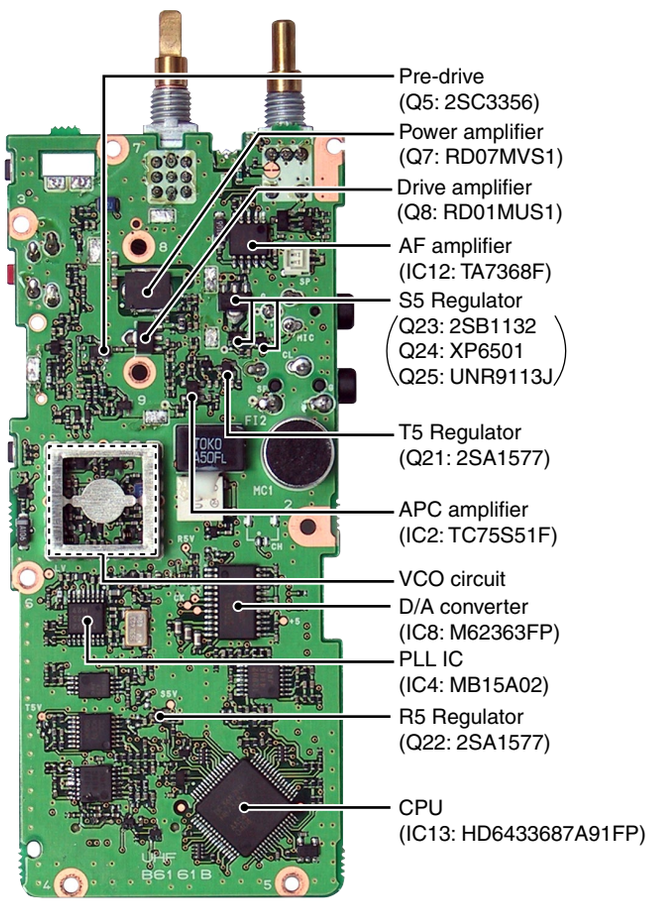
SECTION 2 INSIDE VIEWS

● MAIN UNIT

TOP VIEW



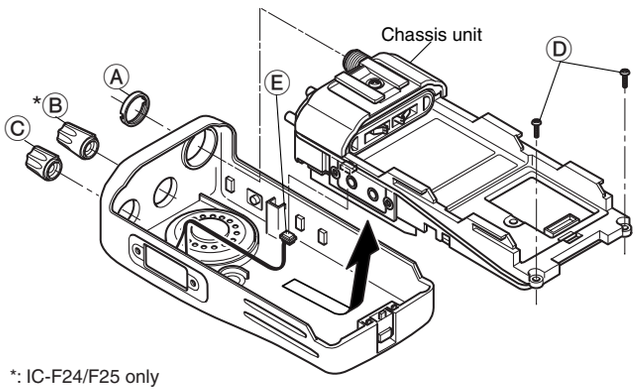
BOTTOM VIEW



SECTION 3 DISASSEMBLY INSTRUCTIONS

● REMOVING THE CHASSIS UNIT

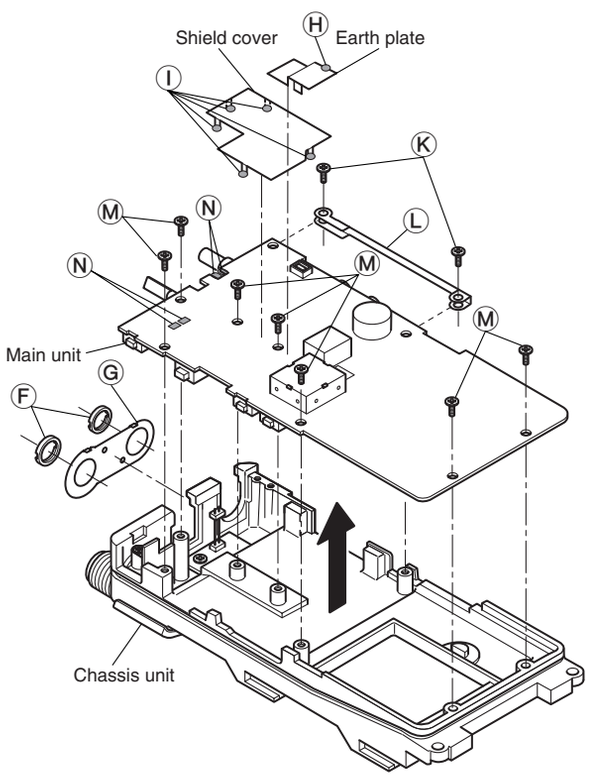
① Unscrew 1 nut Ⓐ, and remove 2 knobs *Ⓑ, Ⓒ.
② Unscrew 2 screws Ⓓ.
③ Take off the chassis unit in the direction of the arrow.
④ Unplug the connector Ⓔ from the chassis unit.



*: IC-F24/F25 only

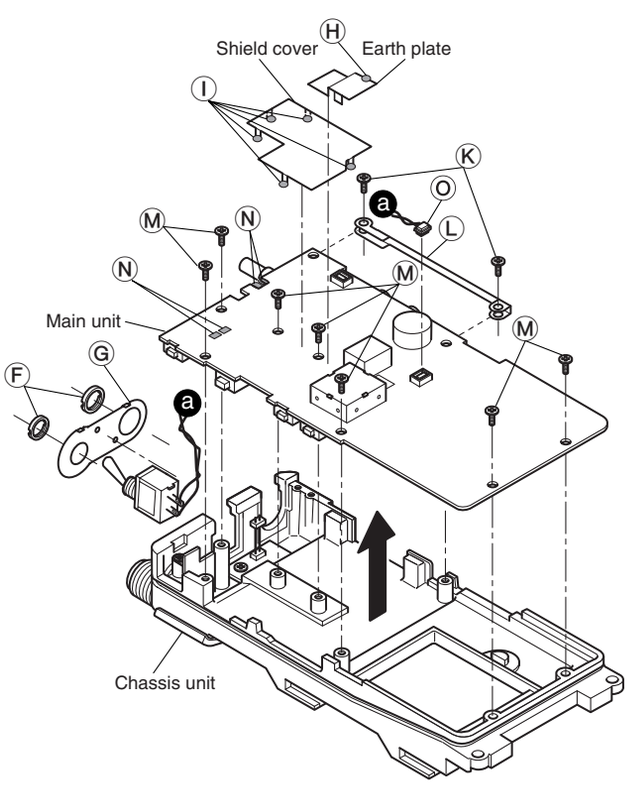
● REMOVING THE MAIN UNIT (IC-F24/F25)

① Unscrew 2 nuts Ⓕ, and remove the top plate Ⓖ.
② Unsolder 1 point Ⓗ, and remove the earth plate.
③ Unsolder 5 points Ⓘ, and remove the shield cover.
④ Unscrew 2 screws Ⓚ, and remove the side plate Ⓛ.
⑤ Unscrew 7 screws Ⓜ.
⑥ Unsolder 4 points Ⓝ, and take off the main unit in the direction of the arrow.



● REMOVING THE MAIN UNIT (IC-F24S/F25S)

① Remove the switch connector Ⓞ.
② Unsolder 2 nuts Ⓕ, and remove the top plate Ⓖ.
③ Unsolder 1 point Ⓗ, and remove the earth plate.
④ Unsolder 5 points Ⓙ, and remove the shield cover.
⑤ Unscrew 2 screws Ⓚ, and remove the side plate Ⓛ.
⑥ Unscrew 7 screws Ⓜ.
⑦ Unsolder 4 points Ⓝ, and take off the main unit in the direction of the arrow.



SECTION 4 CIRCUIT DESCRIPTION

4-1 RECEIVER CIRCUITS

4-1-1 ANTENNA SWITCHING CIRCUIT

The antenna switching circuit functions as a low-pass filter while receiving and a resonator circuit while transmitting. This circuit does not allow transmit signals to enter the receiver circuits.

Received signals enter the antenna connector (CHASSIS; J1) and pass through the low-pass filter (L1, L2, L45, C1–C6, C175). The filtered signals are passed through the $1/4\lambda$ type antenna switching circuit (D2, D5, L5) and then applied to the RF circuit.

4-1-2 RF CIRCUIT

The RF circuit amplifies signals within the range of frequency coverage and filters out-of-band signals.

The signals from the antenna switching circuit pass through the bandpass filter (D3, D4, D7, D8, L7, L8, C21, C23, C24). The filtered signals are amplified at the RF amplifier (Q2) and then passed through the another bandpass filter (D9, D10, C39, C40, C45) to suppress unwanted signals. The filtered signals are applied to the 1st mixer circuit.

D3, D4, D7–D10 employ varactor diodes, that are controlled by the CPU via the D/A converter (IC8), to track the bandpass filter. These varactor diodes tune the center frequency of an RF passband for wide bandwidth receiving and good image response rejection.

4-1-3 1ST MIXER AND 1ST IF CIRCUITS

The 1st mixer circuit converts the received signal into fixed frequency of the 1st IF signal with the PLL output frequency. By changing the PLL frequency, only the desired frequency passes through a crystal filter at the next stage of the 1st mixer.

The RF signals from the bandpass filter are mixed with the 1st LO signals, where come from the RX VCO circuit via the BPF (L12, L38, C49, C304, C305), at the 1st mixer circuit (Q3) to produce a 46.35 MHz 1st IF signal. The 1st IF signal is passed through a monolithic filter (FI1) in order to obtain selection capability and to pass only the desired signal. The filtered signal is applied to the 2nd IF circuit after being amplified at the 1st IF amplifier (Q4).

4-1-4 2ND IF AND DEMODULATOR CIRCUITS

The 2nd mixer circuit converts the 1st IF signal into a 2nd IF signal. The double-conversion superheterodyne system (which converts receive signals twice) improves the image rejection ratio and obtains stable receiver gain.

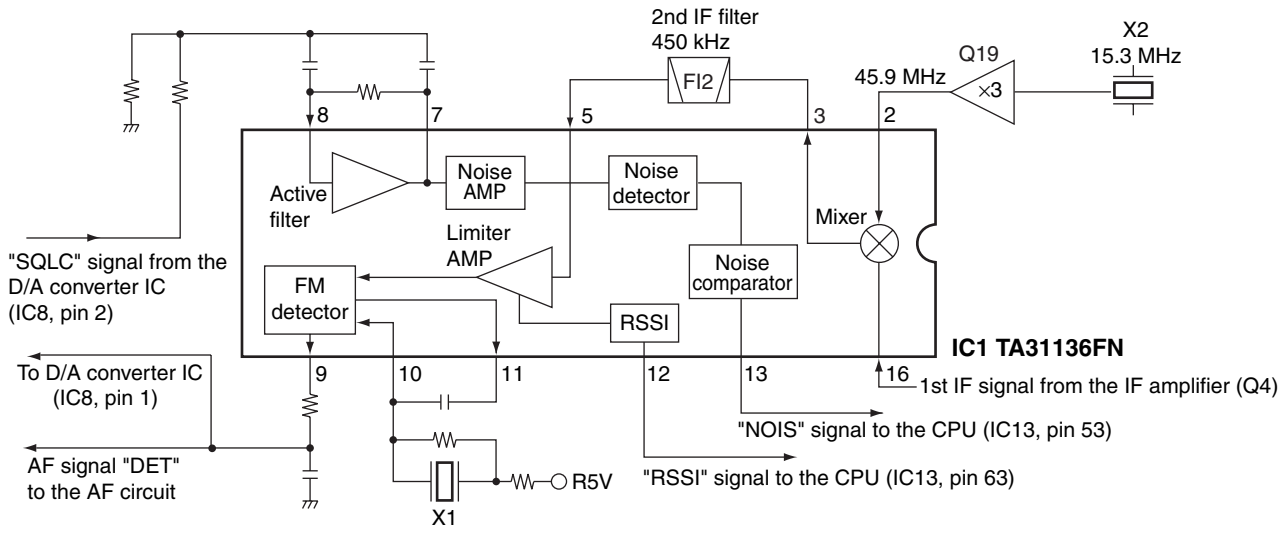
The 1st IF signal from the IF amplifier (Q4) is applied to the 2nd mixer section of the FM IF IC (IC1, pin 16), and is mixed with the 2nd LO signal to be converted into a 450 kHz 2nd IF signal.

The FM IF IC (IC1) contains the 2nd mixer, 2nd local oscillator, limiter amplifier, quadrature detector, active filter and noise amplifier circuits. The 2nd LO signal (45.9 MHz) is produced at the PLL circuit by tripling it's reference frequency (15.3 MHz).

The 2nd IF signal from the 2nd mixer (IC1, pin 3) passes through the ceramic filter (FI2) to remove unwanted heterodyned frequencies. It is then amplified at the limiter amplifier section (IC1, pin 5) and applied to the quadrature detector section (IC1, pins 10, 11) to demodulate the 2nd IF signal into AF signals.

The demodulated AF signals are output from pin 9 (IC1) as "DET" signal, and are then applied to the AF circuit.

• 2ND IF AND DEMODULATOR CIRCUITS



4-1-5 AF AMPLIFIER CIRCUIT

The AF amplifier circuit amplifies the demodulated AF signals to drive a speaker.

The AF signals from the FM IF IC (IC1, pin 9) pass through the high-pass filter (IC6, pins 3 and 1) to suppress unwanted harmonic components. The signals pass through the RX mute switch (Q34) which is controlled by "RMUT" signal from the CPU (IC13, pin 56), and are then applied to another high-pass filter (IC6, pins 13 and 14). The filtered signals pass through the low-pass filter (IC6, pins 6 and 7) via the analog switch (IC10, pins 1 and 2). The signals are applied to the analog switch (IC10, pin 10) again, and are then applied to the AF power amplifier (IC12, pin 4) via the AF volume (R226). The amplified AF signals are output from pin 10, and are then applied to the internal speaker which is connected to J1 via the [SP] jack (J3).

4-1-6 RECEIVE MUTE CIRCUITS

• NOISE SQUELCH

A squelch circuit cuts out AF signals when no RF signals are received. By detecting noise components in the AF signals, the squelch circuit switches the AF mute switch.

Some noise components in the AF signals from the FM IF IC (IC1, pin 9) are applied to the D/A converter (IC8, pin 1) as "DET" signal, and are then output from pin 2. The signals are applied to the active filter section in the FM IF IC (IC1, pin 8). The active filter section filters and amplifies noise components. The amplified signals are converted into the pulse-type signals at the noise detector section and output from pin 13 as "NOIS" signal.

The "NOIS" signal from the FM IF IC is applied to the CPU (IC13, pin 53). Then the CPU analyzes the noise condition and outputs the AF mute control signal from the CPU (pin 56) as "RMUT" signal from pin 56. The signal is applied to the RX mute switch (Q34) to control the AF signal muting.

• CTCSS AND DTCS

The tone squelch circuit detects tone signals and opens the squelch only when the receiving signal contains matched subaudible tone (CTCSS or DTCS). When tone squelch is in use, and a signal with a mismatched or no subaudible tone is received, the tone squelch circuit mutes the AF signals even when noise squelch is open.

A portion of the "DET" signals from the FM IF IC (IC1, pin 9) passes through the low-pass filter (IC7, pins 5 and 7) to remove AF (voice) signals, and are then applied to the amplifier (IC7, pin 3). The amplified signals are applied to the CTCSS or DTCS decoder inside of the CPU (IC13, pin 60) as the "CDEC" signal. The CPU outputs AF mute control signal from pin 56, and is then applied to the RX mute switch (Q34) and analog switch (IC10, pins 12 and 13) to control AF signals muting as "RMUT" signal.

4-2 TRANSMITTER CIRCUITS

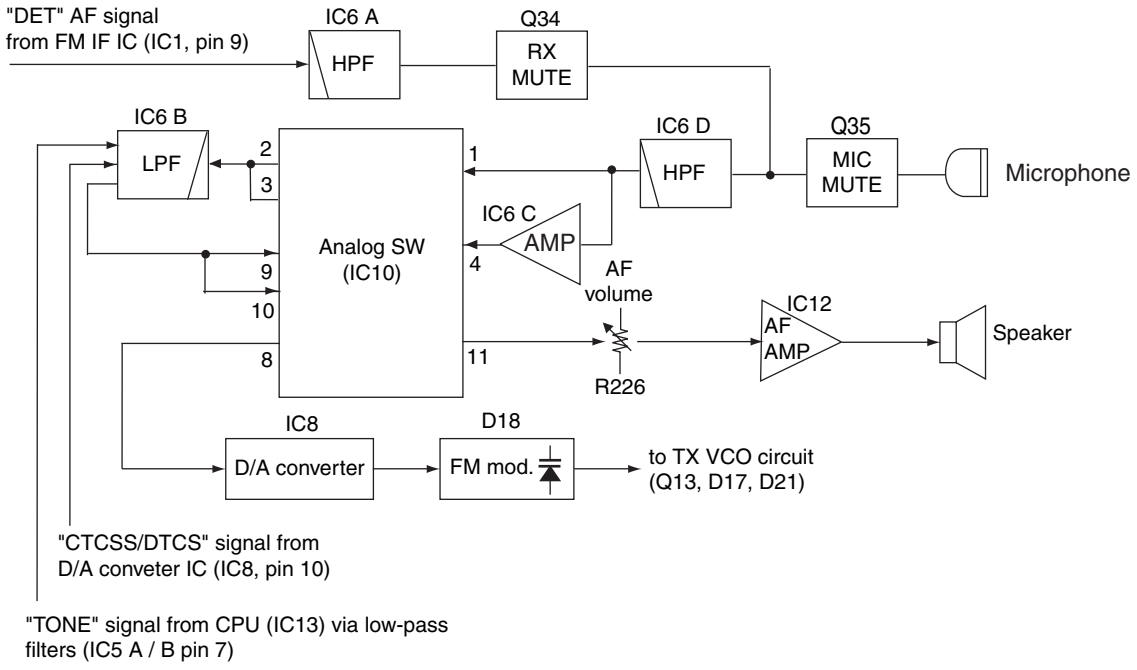
4-2-1 MICROPHONE AMPLIFIER CIRCUIT

The microphone amplifier circuit amplifies audio signals within +6 dB/octave pre-emphasis characteristics from the microphone to a level needed for the modulation circuit.

The AF signals from the microphone are passed through the microphone mute switch (Q35), and are then applied to the amplifier (IC6, pins 9 and 8) via the high-pass filter (IC6, pins 13 and 14). The amplified signals are applied to the analog switch (IC10, pin 4), and outputs from pin 3. The signals pass through the low-pass filter (IC6, pins 6 and 7), then applied to the analog switch (IC10, pin 9) again and output from pin 8.

The signals are applied to the D/A converter (IC8, pin 4). The converted signals output from pin 3, and applied to the modulation circuit (D18) as "MOD" signal.

• ANALOG SWITCHING CIRCUITS



4-2-2 MODULATION CIRCUITS

The modulation circuit modulates the VCO oscillating signal (RF signal) using the audio signals from the microphone.

The AF signals from the D/A converter (IC8, pin 3) change the reactance of varactor diode (D18) to modulate the oscillated signal at the TX VCO circuit (Q13, D17, D21). The modulated VCO signal is amplified at the buffer amplifiers (Q10, Q12) and then applied to the drive amplifier circuit via the T/R switch (D14).

The CTCSS/DTCS signals ("CENC0," "CENC1," "CENC2") from the CPU (IC13, pins 23–25) pass through the low-pass filter (IC5, pins 12 and 14) via 3 registers (R191–R193) to change its waveform. Then the signals are applied to the D/A converter (IC8, pin 9). The output signals from the D/A converter (IC8, pin 10) pass through the low-pass filter (IC6, pins 6 and 7) to be mixed with "MOD" signal, and then applied to the D/A converter again (IC8, pin 4) after passing through the analog switch (IC10, pins 8 and 9).

4-2-3 TRANSMIT AMPLIFIER CIRCUITS

Transmit amplifiers amplify the TX VCO oscillating signal to transmit power level.

The modulated RF signal from the TX VCO circuit passes through the T/R switch (D14) and is amplified at the YGR (Q9), pre-drive (Q5), drive (Q8), and power (Q7) amplifiers to obtain 4 W (max.) of RF power (at 7.2 V DC).

The amplified signal passes through the low-pass filter (L4, C11, C13, C16), antenna switch (D2), the low-pass filter (L1 –L3, C2–C5, C175, C176) and power detector (D1, D30), then applied to the antenna connector (CHASSIS unit; J1).

4-2-4 APC CIRCUITS

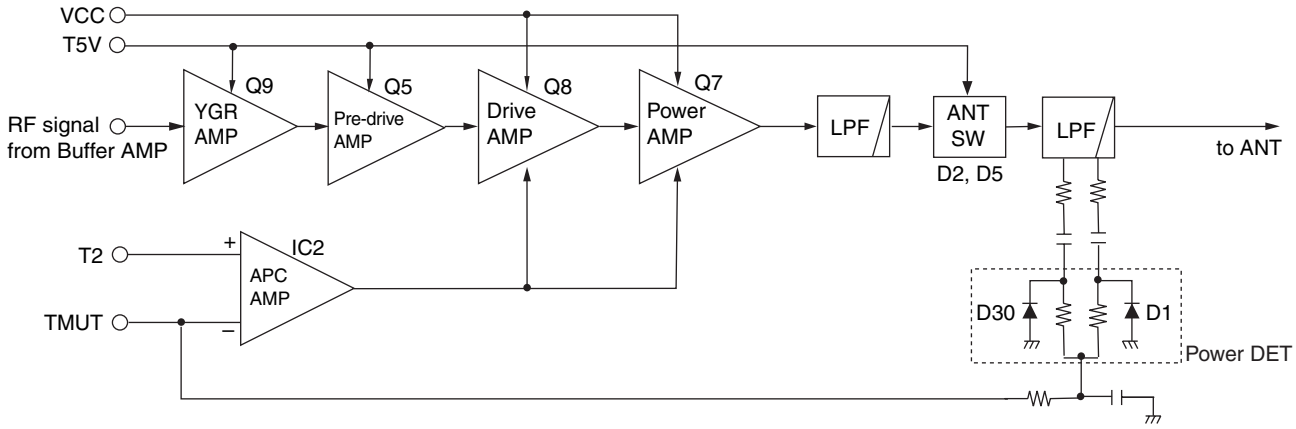
The bias current of the drive (Q8) and power (Q7) amplifiers are controlled by the APC circuit.

The APC circuit (IC2, D1, D30) protects drive and power amplifiers from the reflected signal, and selects output power of HIGH, LOW2 or LOW1.

The power detector (D1, D30) detects transmit output power and converts it into DC voltage. The DC voltage is at a minimum level when the antenna impedance is matched to 50 Ω, and increased when mismatched.

The detected voltage is applied to the differential amplifier (IC2, pin 3), and the "T2" signal from the D/A converter (IC8, pin 23), controlled by the CPU (IC13), is applied to pin 1 for reference. When antenna impedance is mismatched, the detected voltage exceeds the power setting voltage. Then the output voltage of the differential amplifier (IC2, pin 4) controls the input current of the drive (Q8), and power (Q7) amplifiers to reduce the output power.

• APC CIRCUITS



4-3 PLL CIRCUITS

4-3-1 PLL CIRCUIT

A PLL circuit provides stable oscillation for the transmit frequency and the receive 1st LO frequency. The PLL output compares the phase of the divided VCO frequency to the reference frequency. The PLL output frequency is controlled by the divided ratio (N-data) of a programmable divider.

The PLL circuit contains the TX/RX VCO circuits (TX: Q13, D17, D18, D21; RX: Q14, D16, D22). The oscillated signal is amplified at the buffer amplifiers (Q11, Q12) and then applied to the PLL IC (IC4, pin 8) after being passed through the low-pass filter (L32, C206, C208).

The PLL IC (IC4) contains a prescaler, programmable counter, programmable divider and phase detector, charge pump, etc. The entered signal is divided at the prescaler and programmable counter section by the N-data ratio from the CPU. The divided signal is detected on phase at the phase detector using the reference frequency. The phase detected signal is applied to the charge pump to be converted into the DC voltage, and output from pin 5. After passes through the loop filter (C130, C138, C146, C147, R95–R97), the DC voltage is applied to the TX/RX VCO as the lock voltage.

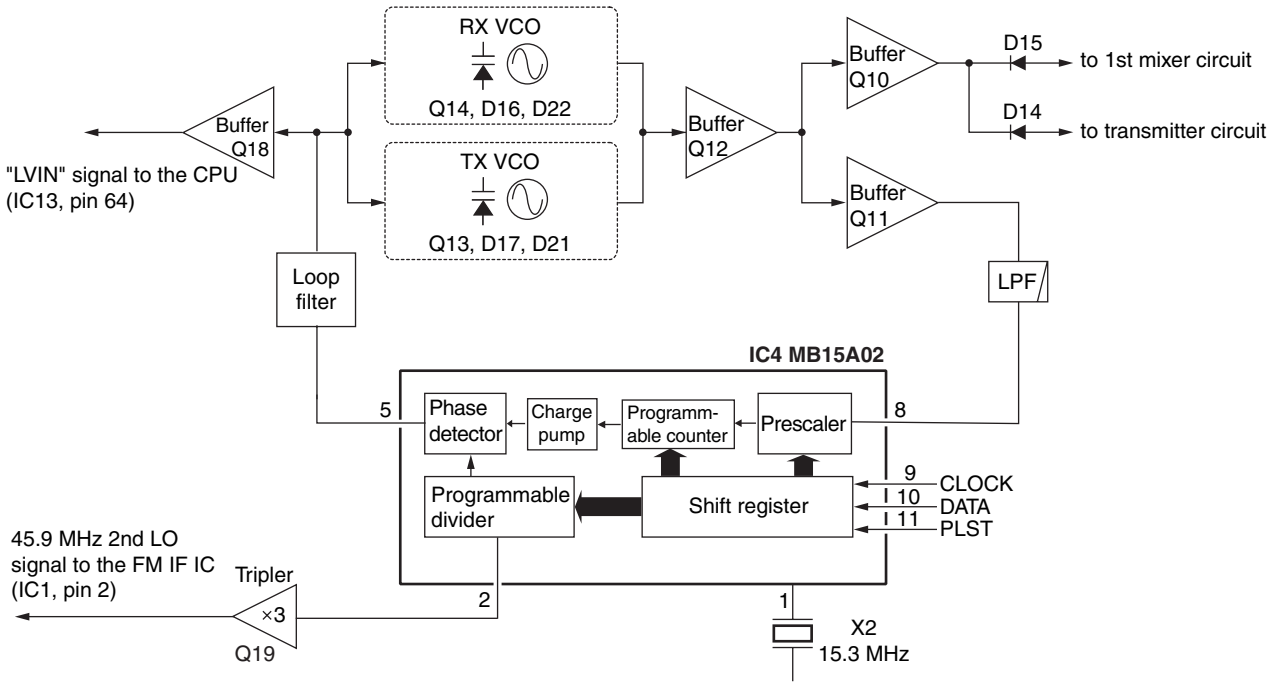
If the oscillated signal drifts, its phase changes from that of the reference frequency, causing a lock voltage change to compensate for the drift in the oscillated frequency.

4-3-2 VCO CIRCUITS

The VCO circuit contains a separate RX VCO (Q14, D16, D22) and TX VCO (Q13, D17, D21). The oscillated signal is amplified at the buffer amplifiers (Q10, Q12) and is then applied to the T/R switch (D14 for TX, D15 for RX). Then the receive 1st LO (RX) signal is applied to the 1st mixer circuit (Q3) and the transmit (TX) signal to the pre-drive amplifier (Q9).

A portion of the signal from the buffer amplifier (Q12) is fed back to the PLL IC (IC4, pin 8) via the buffer amplifier (Q11) and low-pass filter (L32, C206, C208) as the comparison signal.

• PLL CIRCUITS



4-4 OTHER CIRCUITS

LED CONTROL CIRCUITS

The LED control circuit is composed of the CPU (IC13), LED driver (Q32) and LED (DS1).

The CPU outputs “RLED” and “TLED” signals from the pins 42 and 43. The signals are applied to the LED driver (Q32, pins 2 and 5). The driver outputs LED control signals to the LEDs (DS1).

CONDITION	COLOR
RECEIVING (2/5-TONE CODE)	ORANGE (Lighting)
LOW BATTERY (Nearly exhausted)	RED (Blinks Slowly)
LOW BATTERY (Almost exhausted)	RED (Blinks Fast)
CLONING	ORANGE (Blinking)
RECEIVING/SQUELCH OPEN	GREEN (Lighting)
TRANSMITTING	RED (Lighting)

4-5 POWER SUPPLY CIRCUIT

VOLTAGE LINE

LINE	DESCRIPTION
VCC	The voltage from the connected battery pack.
+5V	Common 5 V converted from the VCC line at the +5 regulator circuit (IC9). The output voltage is supplied to the D/A converter (IC8), analog SW (IC10), etc.
S5V	Common 5 V converted from the VCC line at the S5 regulator circuit (Q23–Q25). The output voltage is supplied to the ripple filter (Q17), PLL IC (IC4), etc.
R5V	Receive 5 V converted from the S5V line at the R5 regulator circuit (Q22). The output voltage is supplied to the tripler (Q19), FM IF IC (IC1), IF amplifier (Q4), VCO switch (Q15, Q16), 1st mixer (Q3), etc.
T5V	Transmit 5 V converted from the S5V line at the T5 regulator circuit (Q21). The output voltage is supplied to the YGR (Q9), pre-drive (Q5), APC amplifier (IC2), etc.

4-6 PORT ALLOCATION

4-6-1 D/A CONVERTER IC (IC8)

Pin number	Port name	Description
11	BAL	Outputs the modulation balance level control signal. The signal is applied to the reference frequency crystal oscillator (X2, pin 1).
14	LVA	Outputs the PLL lock voltage control signal. The output signal is applied to the RX VCO (Q14, D16, D22) and TX VCO (Q13, D17, D21).
15	REF	Outputs the reference oscillator correcting voltage. The voltage is applied to the reference frequency crystal oscillator (X2, pin 1).
22	T1	Outputs the bandpass filter tuning signal. The output signal is applied to the bandpass filters (D3, D4, D7, D8).
23	T2	• Outputs the bandpass filter tuning signal during receive. The output signal is applied to the bandpass filters (D9, D10). • Outputs the TX power control signal during transmit. The output signal is applied to the APC amplifier (IC2, pin 1).

4-6-2 CPU (IC13)

Pin number	Port name	Description
1	TEMP	Input port for the transceiver's internal temperature detecting signal.
2	BATV	Input port for the detect signal for connecting battery pack's voltage.
7	RES	Input port for power reset signal.
13	SENC0	Output single tone encoder signal.
14	SENC1	
16	DUSE	Outputs DTSC LPF control signal.
18	AFON	Outputs AF power amplifier control signal.
19	SENC2	Output single tone encoder signal.
20	SENC3	
21	CBI0	Input ports for rotary selector.
22	CBI1	
23	CENC0	Output CTCSS/DTCS signals.
24	CENC1	
25	CENC2	
26	CBI2	Input ports for rotary selector.
27	CBI3	
28	SCK	Outputs serial clock signal to the PLL IC (IC4, pin 9), D/A convertor (IC6, pin 7), etc.
29	SO	Outputs serial data to the PLL IC (IC6, pin 8) and D/A convertor (IC6, pin 8).
30	BEEP	Outputs beep audio signals.
31	ESDA	I/O port for data signals from/to the EEPROM (IC15, pin 5).
32	ESCL	Outputs clock signal to the EEPROM (IC15, pin 6).
33	UNLK	Input port for unlock signal from PLL IC.
34	PLST	Outputs strobe signals to the PLL IC (IC4, pin 11).
36	NWC	Output/input port for wide/ narrow control signal.
37	DAST	• Outputs strobe signals to the D/A convertor (IC8, pin 6). • Input port for the connecting battery type detect signal.
38	S5C	Outputs power save control signal.
39	T5C	Outputs T5 regurator control signal. Low: While transmitting
40	R5C	Outputs R5 regurator control signal. Low: While receivinging

Pin number	Port name	Description
42	RLED	Outputs receiving LED control signal.
43	TLED	Outputs transmitting LED control signal.
44	OPT3	I/O ports for option unit.
45	OPT1	
46	OPT2	
47	PTT	Input port for the PTT switch detection signal. Low : While the PTT switch is pushed.
48	SI	Serial Bus inputport.
49	CLI	Input port for the cloning data signal.
50	CLO	Outputs the cloning data signal.
53	NOIS	Input port for the noise signal from the FM IF IC (MAIN unit; IC1, pin 13).
54	CIRQ	Input port for option unit detection.
55	CCS	Outputs chip select signal.
56	TMUT	Outputs transmit mute signal.
57	RMUT	Input port for AF mute signal from the RX circuit.
58	MMUT	Outputs MIC mute signal.
59	REMO	Inputs key signal from remote mic.
60	CDEC	Input port for CTCSS/DTCS signal from the amplifier (IC5, pin 8).
61	SDEC	Input port for single tone decode signal from the LPF (IC5, pin 8).
62	KEY	Inputs key input signal.
63	RSSI	Input port for the S-meter signal from the FM IF IC (IC1, pin 12).
64	LVIN	Input port for the PLL lock voltage.

SECTION 5 ADJUSTMENT PROCEDURES

5-1 PREPARATION

When adjusting IC-F24/F25/S, the optional CS-F14 ADJ ADJUSTMENT SOFTWARE (Rev. 1.0 or later), JIG cable (see the illust below) and OPC-478 (RS-232 type) or OPC-478U (USB type) CLONING CABLE are required.

■ REQUIRED TEST EQUIPMENTS

EQUIPMENT	GRADE AND RANGE	EQUIPMENT	GRADE AND RANGE
DC power supply	Output voltage : 7.2 V DC Current capacity : 5 A or more	Audio generator	Frequency range : 300–3000 Hz Output level : 1–500 mV
FM deviation meter	Frequency range : DC–600 MHz Measuring range : 0 to ±10 kHz	Attenuator	Power attenuation : 20 or 30 dB Capacity : 10 W or more
Frequency counter	Frequency range : 0.1–600 MHz Frequency accuracy : ±1 ppm or better Sensitivity : 100 mV or better	Standard signal generator (SSG)	Frequency range : 100–600 MHz Output level : 0.1 µV–32 mV (–127 to –17 dBm) (As open circuit.)
Digital multimeter	Input impedance : 10 MΩ/V DC or better		
RF power meter (terminated type)	Measuring range : 1–10 W Frequency range : 100–600 MHz Impedance : 50 Ω SWR : Less than 1.2 : 1	DC voltmeter	Input impedance : 50 kΩ/V DC or better
		Oscilloscope	Frequency range : DC–20 MHz Measuring range : 0.01–20 V
SINAD meter	Measuring range : 20–20 kHz	AC millivoltmeter	Measuring range : 10 mV–10 V

■ SYSTEM REQUIREMENTS

- Microsoft® Windows® 98/SE/ME/2000/XP
- RS232C/USB port

■ BEFORE STARTING SOFTWARE ADJUSTMENT

Clone adjustment freqencies, TX power, CTCSS frequency, DTCS code and IF bandwidth (see ADJUSTMENT CONFIGULATION on the next page) into the transceiver using with the CS-F14 CLONING SOFTWARE before starting SOFTWARE ADJUSTMENTS. Otherwise, the transceiver can not be adjusted.

CAUTION!: BACK UP the originally programmed memory data in the transceiver before programming the adjustment frequencies.
When program the adjustment frequencies into the transceiver, the transceiver's memory data will be overwritten and lose original memory data at the same time.

■ STARTING SOFTWARE ADJUSTMENT

(1) Connect IC-F24/F25/S and PC with OPC-478/U and JIG CABLE.
(2) Turn the transceiver power ON.
(3) Boot up Windows, and click the program group 'CS-F14 ADJ' in the 'Programs' folder of the [Start] menu, then CS- F14 ADJ's window appears.
(4) Click 'Connect' on the CS-F14's window, then appears IC-F14's up-to-date condition.
(5) Set or modify adjustment data as desired.

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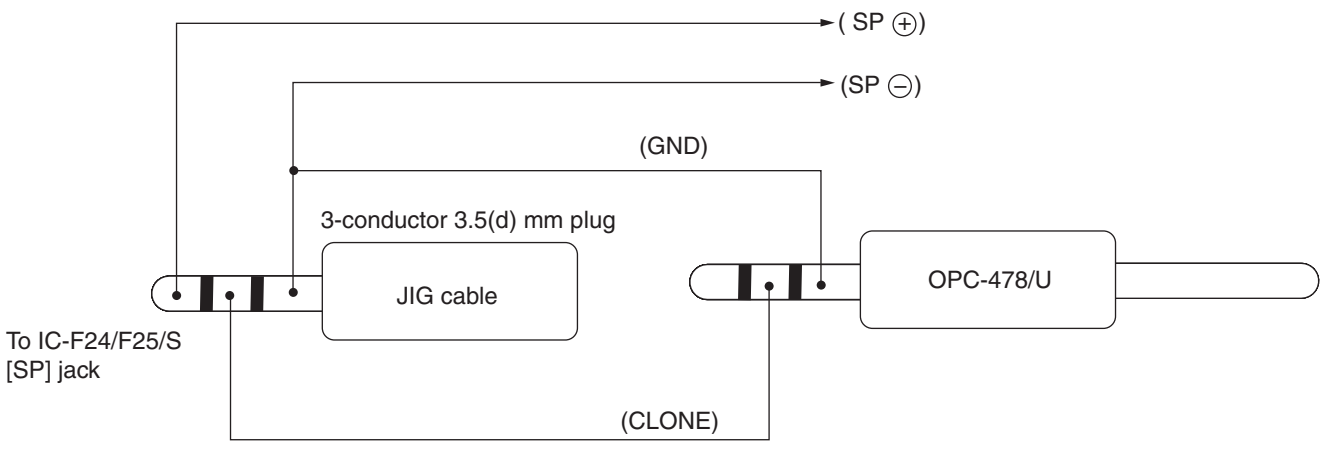
• JIG CABLE



5-2 CONFIGULATION LIST FOR ADJUSTMENTS

- IC-F24/F25 -

[US2]=USA-02, [GE2]=GEN-02, [EU2]=EUR-02, [US3]=USA-03, [GE3]=GEN-03

CH.	FREQUENCY (MHz)		SETTING CONDITION	CH.	FREQUENCY (MHz)		SETTING CONDITION
	[US2], [EU2], [GE2]	[US3], [GE3]			[US2], [EU2], [GE2]	[US3], [GE3]	
1	400.000	450.000	Set TX power to High.	7	435.000	485.000	Set TX power to Low1. Set DTCS code to 007. Set IF bandwidth to Wide/Middle. (Middle : EUR only)
2	400.000	450.000	Set TX power to Low1.	8	435.000	485.000	Set TX power to Low1. Set IF bandwidth to Narrow.
3	400.000	450.000	Set TX power to Low2.				
4	435.000	485.000	Set TX power to Low1.				
5	470.000	520.000	Set TX power to Low1.	9	435.000	485.000	Set TX power to Low1. Set IF bandwidth to Wide/Middle. (Middle : EUR only)
6	435.000	485.000	Set TX power to Low1. Set DTCS code to 007. Set IF bandwidth to Narrow.	10	435.000	485.000	Set TX power to Low1. Set IF bandwidth to Wide. Set CTCSS to 151.4Hz.
				11	400.000	450.000	Set IF bandwidth to Wide.

- IC-F24S/F25S -

• Re-clone these settings every time each category is adjusted. (1–8).

1.PLL LOCK VOLTAGE
2.REFERENCE FREQENCY

CH.	FREQUENCY (MHz)		SETTING CONDITION
	[US2], [EU2], [GE2]	[US3], [GE3]	
1	400.000	450.000	Set TX power to Low1.
2	470.000	520.000	Set TX power to Low1.

3.TX POWER

CH.	FREQUENCY (MHz)		SETTING CONDITION
	[US2], [EU2], [GE2]	[US3], [GE3]	
1	400.000	450.000	Set TX power to High.
2	400.000	450.000	Set TX power to Low2.
3	400.000	450.000	Set TX power to Low1.

4.FM DEVIATION

CH.	FREQUENCY (MHz)		SETTING CONDITION
	[US2], [EU2], [GE2]	[US3], [GE3]	
1	435.000	485.000	Set TX power to Low1. Set IF bandwidth to Narrow.
2	435.00	485.00	Set TX power to Low1. Set IF bandwidth to Wide/Middle. (Middle : [EUR] only)

5.MODULATION BALANCE

CH.	FREQUENCY (MHz)		SETTING CONDITION
	[US2], [EU2], [GE2]	[US3], [GE3]	
1	435.000	485.000	Set TX power to Low1. Set DTCS code to 007. Set IF bandwidth to Narrow.
2	435.000	485.000	Set TX power to Low1. Set DTCS code to 007. Set IF bandwidth to Wide/Middle. (Middle : [EUR] only)

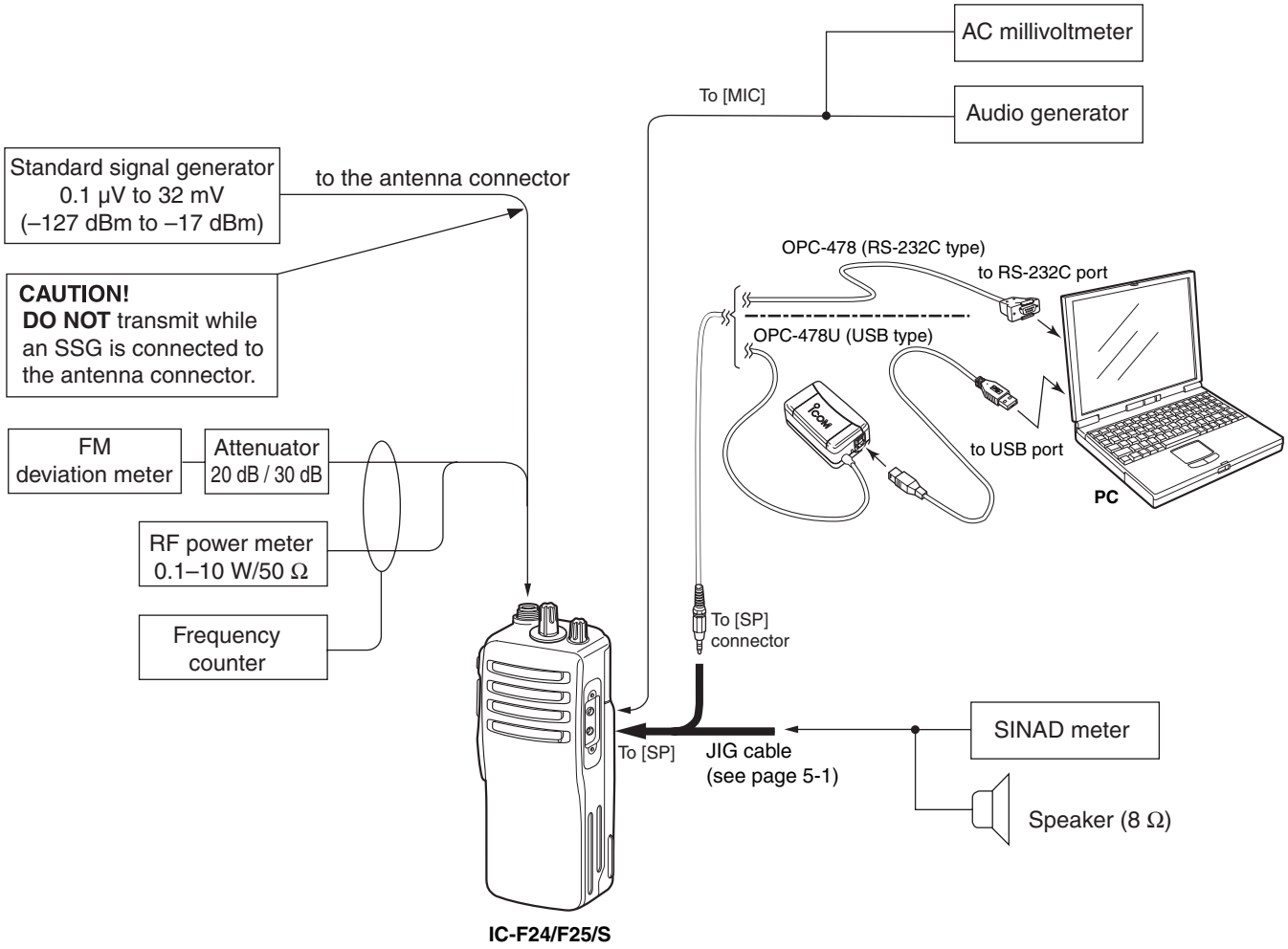
6.CTCSS/DTCS DEVIATION

CH.	FREQUENCY (MHz)		SETTING CONDITION
	[US2], [EU2], [GE2]	[US3], [GE3]	
1	435.000	485.000	Set TX power to Low1. Set IF bandwidth to Wide. Set CTCSS to 151.4Hz.

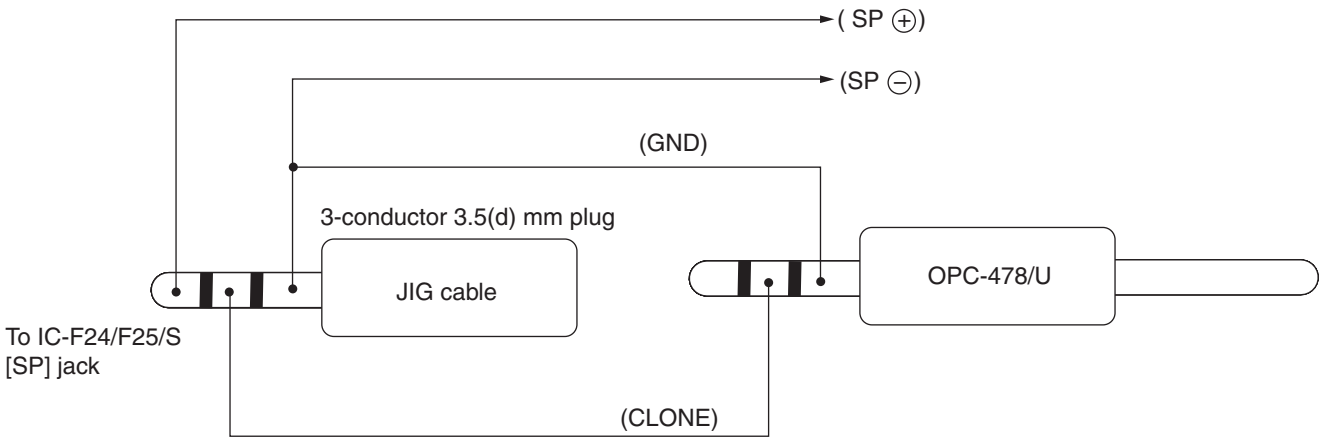
7.RX SENSITIVITY
8.SQUELCH LEVEL

CH.	FREQUENCY (MHz)		SETTING CONDITION
	[US2], [EU2], [GE2]	[US3], [GE3]	
1	400.000	450.000	Set IF bandwidth to Wide.

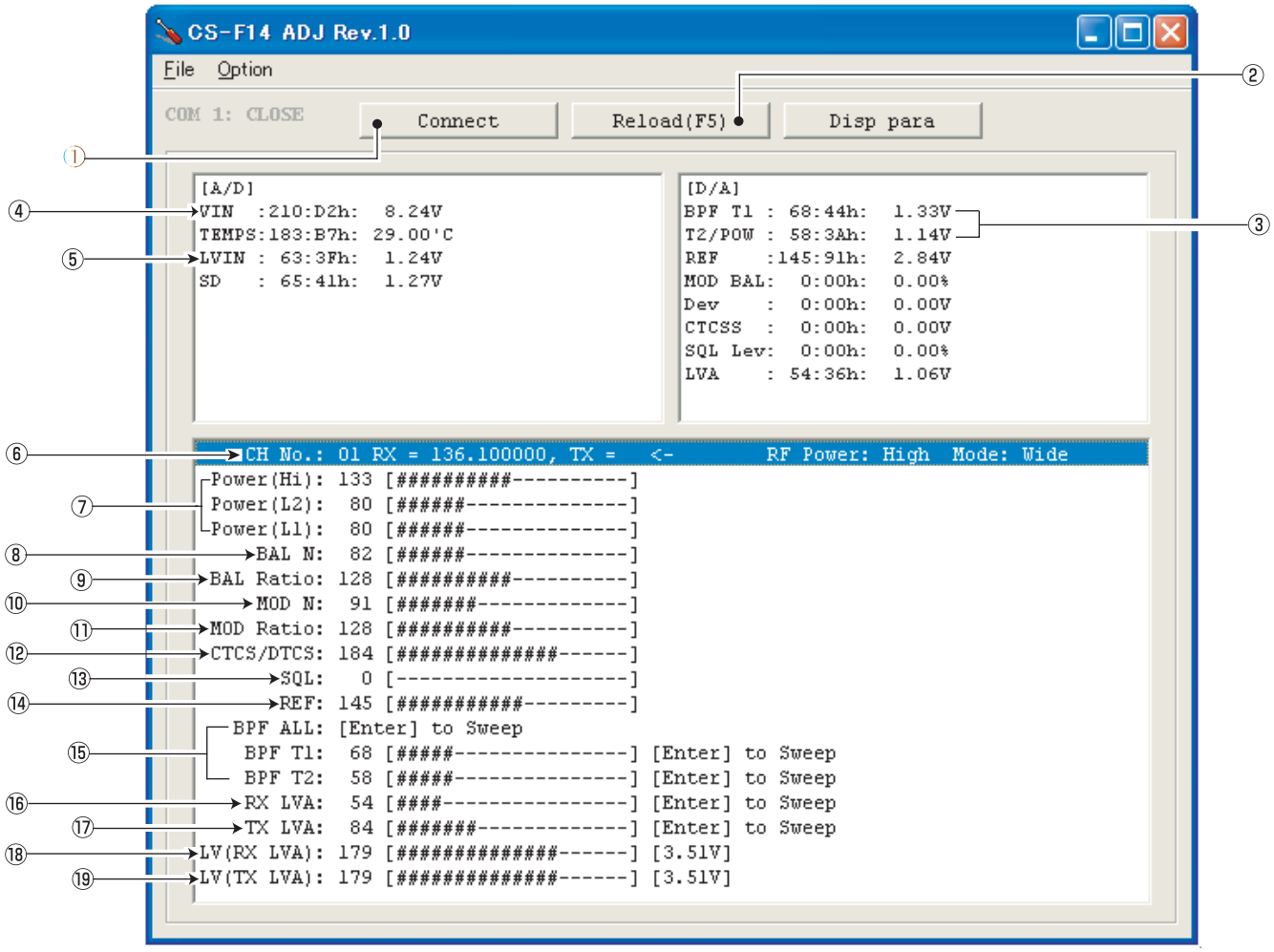
• CONNECTION



• JIG CABLE



• PC SCREEN EXAMPLE



NOTE: The above screen is an example.
Each transceiver has its own specific values for each setting.

①: Transceiver's connection state

②: Reload adjustment data

③: Receive sensitivity measurement

④: Connected DC voltage measurement

⑤: PLL lock voltage measurement

⑥: Operating channel select

⑦: RF output power

⑧: FM deviation balance (Narrow)

⑨: FM deviation balance (Wide)

⑩: FM deviation (Narrow)

⑪: FM deviation (Wide)

⑫: CTCSS/DTCS deviation

⑬: Squelch level

⑭: Reference frequency

⑮: Receive sensitivity (automatically)

⑯: PLL lock voltage for RX (automatically)

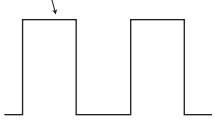
⑰: PLL lock voltage for TX (automatically)

⑱: PLL lock voltage for RX (manually)

⑲: PLL lock voltage for RX (manually)

5-3 SOFTWARE ADJUSTMENTS (TRANSMITTING)

Select the operation using [↑] / [↓] keys, then set specified value using [←] / [→] keys on the connected computer keyboard.

ADJUSTMENT		ADJUSTMENT CONDITION	MEASUREMENT		VALUE
			UNIT	LOCATION	
PLL LOCK VOLTAGE [LV (RX LVA)] [LV (TX LVA)	1	• Operating CH : CH2 (*CH1) • Receiving	PC screen	"LVIN" item on the CS-F14 ADJ's screen.	1.0 V
	2	• Operating CH : CH2 (*CH1) • Connect an RF power meter or 50 Ω dummy load to the antenna connector. • Transmitting			1.0 V
		CONVENIENT: PLL LOCK VOLTAGE can be adjusted automatically. Select "TX LVA"/"TX LVA" item on the CS-F14 ADJ screen, and push [ENTER] key.			
	3	• Operating CH : CH5 (*CH2) • Receiving	PC screen	"LVIN" item on the CS-F14 ADJ's screen.	3.3–4.5 V (Verify)
	4	• Operating CH : CH5 (*CH2) • Connect an RF power meter or 50 Ω dummy load to the antenna connector. • Transmitting			3.3–4.5 V (Verify)
REFERENCE FREQUENCY [REF]	1	• Operating CH : CH5 (*CH1) • Transmitting	Top panel	Loosely couple the frequency counter to the antenna connector.	470.0000 MHz [US2], [EU2], [GE2] 520.0000 MHz [US3], [GE3]
OUTPUT POWER [Power (Hi)]	1	• Operating CH : CH1 (*CH1) • Transmitting	Top panel	Connect the RF power meter to the antenna connector.	4.0 W
[Power (L2)]	2	• Operating CH : CH3 (*CH2) • Transmitting			2.0 W
[Power (L1)]		• Operating CH : CH2 (*CH3) • Transmitting			1.0 W
FM DEVIATION [MOD N] (Narrow)	1	• Operating CH : CH8 (*CH1) • Set the deviation meter as: HPF : OFF LPF : 20 kHz De-emphasis : OFF Detector : (P_P)/2 • Connect the audio generator the [MIC] connector and set as : 1.0 kHz 150mV rms • Transmitting	Top panel	Connect the FM deviation meter to the antenna connector through the attenuator.	±2.10 kHz
[MOD Ratio] (Middle; EUR only)	2	• Operating CH : CH9 (*CH2) • Transmitting			±3.20 kHz
[MOD Ratio] (Wide)	3	• Operating CH : CH9 (*CH2) • Transmitting			±4.10 kHz
MODULATION BALANCE [BAL N] (Narrow)	1	• Operating CH : CH6 (*CH1) • No audio applied to the [MIC] input. • Set the deviation meter as: HPF : OFF LPF : 20 kHz De-emphasis : OFF Detector : (P_P)/2 • Transmitting	Top panel	Connect the FM deviation meter with the oscilloscope to the antenna connector through an attenuator.	Set to square wave form 
[BAL Ratio] (Middle; EUR only)	2	• Operating CH : CH7 (*CH2) • Transmitting			
[BAL Ratio] (Wide)	3	• Operating CH : CH7 (*CH2) • Transmitting			

*For F24S/F25S adjustment.

5-3 SOFTWARE ADJUSTMENTS (RECEIVING)

• Select an operation using [↑] / [↓] keys, then set specified value using [←] / [→] keys on the connected computer keyboard.

ADJUSTMENT		ADJUSTMENT CONDITION	MEASUREMENT		VALUE
			UNIT	LOCATION	
CTCSS/DTCS DEVIATION [CTCS/DTCS]	1	• Operating CH : CH10 (*CH1) • No audio applied to the [MIC] input. • Transmitting	Top panel	Connect the FM deviation meter to the antenna connector through the attenuator.	±0.68 kHz
RX SENSITIVITY [BPF T1], [BPF T2]	1	• Operating CH : CH11 (*CH1) • Connect a standard signal generator to the antenna connector and set as: Frequency : 400.000 MHz [US2], [EU2], [GE2] 450.000 MHz [US3], [GE3] Level : +20 dBμ (–87dBm) Modulation : 1 kHz Deviation : ±3.5 kHz • Receiving	Side Panel	Connect the SINAD meter with an 8 Ω load to the [SP] jack through the JIG cable.	Minimum distortion level
		CONVENIENT: RX SENSITIVITY can be adjusted automatically. Select "BPF ALL" item on the CS-F14 ADJ's screen, and push [ENTER] key.			
SQUELCH LEVEL [SQL]	1	• Operating CH : CH11 (*CH1) • Connect an SSG to the antenna connector and set as: Frequency : 400.000 MHz [US2], [EU2], [GE2] 450.000 MHz [US3], [GE3] Level : –14 dBμ (–121dBm) Modulation : 1 kHz Deviation : ±3.5 kHz • Receiving	Side pannel	Connect a speaker to the [SP] jack through the JIG cable.	Set “SQL level” to close squelch. Then set “SQL level” at the point where the audio signals just appears.

*For F24S/F25S adjustment.

SECTION 6 PARTS LIST

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
IC1	1110003200	S.IC TA31136FN (EL)	B	51.8/19
IC2	1130008560	S.IC TC75S51F (TE85L)	T	68.9/21
IC4	1140005990	S.IC MB15A02PFV1-G-BND-ER	T	38.3/35.7
IC5	1110005340	S.IC NJM12902V-TE1	T	29.7/11.6
IC6	1110005320	S.IC NJM13403V-TE1	T	15.9/34.6
IC7	1110005330	S.IC NJM12904V-TE1	T	29.2/34.6
IC8	1190000350	S.IC M62363FP-650C	T	40.3/15.2
IC9	1110005350	S.IC NJM2870F05-TE1	B	84.2/14.2
IC10	1130011770	S.IC CD4066BPWR	T	22.9/34.6
IC12	1110001810	S.IC TA7368F (ER)	T	89.3/13.2
IC13	1140012260	S.IC HD64F3687FP [US2], [GE2]	T	12.5/14.3
	1140012350	S.IC HD6433687A91FP [Others]		
IC14	1110006260	S.IC BD5242G-TR	T	6.6/5.9
IC15	1130011540	S.IC BR24L16FV-WE2	B	16/11.6
Q1	1560000840	S.FET 2SK1829 (TE85R)	T	75/39.6
Q2	1580000730	S.FET 3SK293 (TE85L)	B	76.8/37.9
Q3	1580000760	S.FET 3SK299-T1 U73	B	66.2/37.9
Q4	1530002600	S.TR 2SC4215-O (TE85R)	B	51.4/23.1
Q5	1530000371	S.TR 2SC3356-T1B S (R25)	T	74.3/33.5
Q6	1590003230	S.TR UNR9113J-(TX)	T	72.5/19.1
Q7	1560001230	S.FET RD07MVS1	T	82.6/27
Q8	1560001240	S.FET RD01MUS1	T	76.1/27.5
Q9	1530003310	S.TR 2SC5107-O (TE85R)	T	67/30.3
Q10	1530003310	S.TR 2SC5107-O (TE85R)	T	59.4/36.3
Q11	1530003310	S.TR 2SC5107-O (TE85R)	B	56.3/37
Q12	1530003310	S.TR 2SC5107-O (TE85R)	T	59/31.5
Q13	1530002920	S.TR 2SC4226-T1 R25	T	54.9/30.7
Q14	1530002920	S.TR 2SC4226-T1 R25	T	54.2/37.1
Q15	1590001400	S.TR XP1214 (TX)	B	56.5/32.6
Q16	1590003290	S.TR UNR9213J-(TX)	B	59.1/32.6
Q17	1530002850	S.TR 2SC4116-BL (TE85R)	T	55.5/44.1
Q18	1560000540	S.FET 2SK880-Y (TE85R)	B	51.5/40.4
Q19	1530002850	S.TR 2SC4116-BL (TE85R)	T	43.3/29.9
Q21	1510000920	S.TR 2SA1577 T106 Q	T	71.9/16.4
Q22	1510000920	S.TR 2SA1577 T106 Q	T	24.9/25.9
Q23	1520000460	S.TR 2SB1132 T100 R	T	81/15.2
Q24	1590001190	S.TR XP6501-(TX) .AB	T	76.3/15.1
Q25	1590003230	S.TR UNR9113J-(TX)	T	75.7/11.7
Q26	1590003290	S.TR UNR9213J-(TX)	T	49.7/18.4
Q27	1590003290	S.TR UNR9213J-(TX)	T	24.8/16.7
Q28	1590003430	S.TR UNR911HJ-(TX)	B	63.1/10.6
Q29	1590003270	S.TR UNR9210J-(TX)	B	35.7/9.2
Q30	1510001080	S.TR 2SA2048 TLR	T	91.9/8.6
Q31	1590001190	S.TR XP6501-(TX) .AB	T	91.4/5.2
Q32	1590003020	S.TR XP4216-(TX)	T	16.5/23.1
Q33	1590003230	S.TR UNR9113J-(TX)	T	19.9/22.5
Q34	1560001360	S.FET 2SK3019 TL	T	10.7/30.1
Q35	1560001360	S.FET 2SK3019 TL	T	9.1/26.6
D1	1750001080	S.DIO RB886G T2R	B	90.2/38.7
D2	1750000580	S.DIO 1SV307 (TPH3)	B	91.5/31.1
D3	1750000710	S.VCP HVC350BTRF	B	87.5/33.5
D4	1750000710	S.VCP HVC350BTRF	B	87.5/34.8
D5	1790001260	S.DIO MA2S077-(TX)	B	87.4/36.7
D6	1790001240	S.DIO MA2S728-(TX)	B	85/39.9
D7	1750000710	S.VCP HVC350BTRF	B	81.8/33.5
D8	1750000710	S.VCP HVC350BTRF	B	81.8/34.8
D9	1750000710	S.VCP HVC350BTRF	B	73.6/35.9
D10	1750000710	S.VCP HVC350BTRF	B	72.2/35.9
D14	1790001260	S.DIO MA2S077-(TX)	T	65.8/35.3
D15	1790001260	S.DIO MA2S077-(TX)	T	65.8/36.7
D16	1750000710	S.VCP HVC350BTRF	T	52.6/38.9
D17	1750000710	S.VCP HVC350BTRF	T	49.4/28.3
D18	1720000570	S.VCP MA368 (TX)	B	49.6/26.9
D21	1750000710	S.VCP HVC350BTRF	T	50.5/33.7
D22	1750000710	S.VCP HVC350BTRF	T	50.5/35.2
D24	1790001250	S.DIO MA2S111-(TX)	T	41.5/39.2
D25	1790001250	S.DIO MA2S111-(TX)	T	70.5/40.4
D26	1790001790	S.DIO RB876W TL	B	35.7/7.1
D27	1750000520	S.DIO DAN222TL	B	21.3/6
D28	1790001260	S.DIO MA2S077-(TX)	B	8.5/11.2
D29	1750000940	S.DIO ISS400 TE61	B	23.1/4
D30	1750001080	S.DIO RB886G T2R	T	88.5/36.2
D31	1790001010	S.ZEN MA8043-L (TX) [US3], [GE3], [US3S], [GE3S] only	B	74.5/19.9
FI1	2030000150	S.MLH FL-335 (46.350 MHz)	B	62.8/27.7
FI2	2020001840	CER ALFYM450F=K		
FI3	2040001440	S.LC NFE31PT152Z1E9L	B	81.2/17.8

[US2]=USA-02, [GE2]=GEN-02, [EU2]=EUR-02, [US3]=USA-03, [GE3]=GEN-03 S.=Surface mount

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
X1	6070000190	S.DCR CDBCB450KCAY24-R0	T	54.4/20
X2	6050011940	S.XTL CR-783 (15.3 MHz)	T	36.9/28.9
X3	6050011720	S.XTL CR-764 (19.6608 MHz)	B	12/5.9
L1	6200008700	S.COL 0.30-0.9-6TR 17.5N	B	94.7/36.4
L2	6200008240	S.COL 0.30-0.9-5TL 14N	B	94.8/31.9
L3	6200009470	S.COL 0.40-0.9-2TL	B	92.9/26.3
L4	6200009470	S.COL 0.40-0.9-2TL	B	89.9/20.6
L5	6200009070	S.COL LQW18AN18NG00D [US3], [GE3], [US3S], [GE3S]	B	89.1/36.5
	6200010850	S.COL LQW18AN22NG00D [Others]		
L7	6200007690	S.COL LQW2BHN18NJ01L [US3], [GE3], [US3S], [GE3S]	B	84.3/34.5
	6200007700	S.COL LQW2BHN22NJ01L [Others]		
L8	6200007690	S.COL LQW2BHN18NJ01L [US3], [GE3], [US3S], [GE3S]	B	78.9/35.3
	6200007700	S.COL LQW2BHN22NJ01L [Others]		
L9	6200007670	S.COL LQW2BHN10NJ01L [US3], [GE3], [US3S], [GE3S]	B	75.9/35.2
	6200007680	S.COL LQW2BHN12NJ01L [Others]		
L11	6200007230	S.COL LQW2BHN15NJ01L [US2], [EU2], [GE2], [US2S], [EU2S], [GE2S]	B	70.6/37.8
	6200007680	S.COL LQW2BHN12NJ01L [Others]		
L12	6200005720	S.COL ELJRE 33NG-F [US2], [EU2], [GE2], [US2S], [EU2S], [GE2S]	B	63.5/38.8
	6200005730	S.COL ELJRE 39NG-F [Others]		
L13	6200003350	S.COL ELJNC R27K-F	B	66.8/33.9
L15	6200002850	S.COL NL 252018T-R82J	T	94.2/32.4
L17	6200008220	S.COL 0.40-1.4-5TR 21N	B	81.2/20.9
L18	6200006770	S.COL ELJRE 1N5Z-F	B	81.2/20.9
L19	6200005660	S.COL ELJRE 10NG-F [US3], [GE3], [US3S], [GE3S]	T	76/35.5
	6200005670	S.COL ELJRE 12NG-F [Others]		
L20	6200005680	S.COL ELJRE 15NG-F [US3], [GE3], [US3S], [GE3S]	T	68.8/33.1
	6200005690	S.COL ELJRE 18NG-F [Others]		
L21	6200007880	S.COL ELJRF 33NJF2 (33)	T	59.2/38.6
L22	6200007900	S.COL ELJRF 22NJF2 (22)	T	59.5/33.3
L23	6200002850	S.COL NL 252018T-R82J	T	55.2/28.1
L25	6200008490	S.COL 0.30-0.9-3TR 7.5N	T	49.5/29.9
L26	6200008510	S.COL 0.30-0.9-4TR 10.5N	T	49/37.9
L27	6200004950	S.COL NL 252018T-1R8J	B	52.8/29
L28	6200004950	S.COL NL 252018T-1R8J	B	52/36.6
L29	6200004660	S.COL MLF1608A 1R8K-T	T	43.9/36.4
L30	6200007880	S.COL ELJRF 33NJF2 (33)	B	85.1/38.7
L32	6200007910	S.COL ELJRF 18NJF2 (18)	B	55.9/42.3
L33	6200004480	S.COL MLF1608D R82K-T	T	43.4/25.9
L35	6200003540	S.COL MLF1608D R22K-T	T	41.7/31.8
L38	6200005710	S.COL ELJRE 27NG-F	B	65.6/40.7
L40	6200002850	S.COL NL 252018T-R82J	T	53.6/34.6
L41	6200007880	S.COL ELJRF 33NJF2 (33)	B	58.4/38.2
L42	6200004950	S.COL NL 252018T-1R8J	B	49.4/34
L43	6200004950	S.COL NL 252018T-1R8J	B	49.4/31.1
L45	6200008700	S.COL 0.30-0.9-6TR 17.5N	B	94.9/39.6
R1	7030003490	S.RES ERJ3GEYJ 272 V (2.7 kΩ)	B	91.8/39.9
R2	7030005120	S.RES ERJ2GEJ 102 X (1 kΩ)	B	92.1/37.7
R3	7030004970	S.RES ERJ2GEJ 470 X (47 Ω) [US2], [EU2], [GE2], [US2S], [EU2S], [GE2S]	T	66.7/22.7
	7030005570	S.RES ERJ2GEJ 820 X (82 Ω) [Others]		
R4	7030005050	S.RES ERJ2GEJ 103 X (10 kΩ)	T	75.8/20.8
R5	7030005050	S.RES ERJ2GEJ 103 X (10 kΩ) [US2], [EU2], [GE2], [US2S], [EU2S], [GE2S]	T	73.3/21.1
	7030005220	S.RES ERJ2GEJ 223 X (22 kΩ) [Others]		
R6	7030005090	S.RES ERJ2GEJ 104 X (100 kΩ)	T	66.7/18.2
R7	7030005310	S.RES ERJ2GEJ 124 X (120 kΩ)	T	68/17.7
R8	7030005100	S.RES ERJ2GEJ 154 X (150 kΩ) [US3], [GE3], [US3S], [GE3S]	T	71.3/21.1
	7030005170	S.RES ERJ2GEJ 474 X (470 kΩ) [Others]		
R9	7030008280	S.RES ERJ2GEJ 271 X (270 Ω)	T	71.3/22.4
R10	7030005120	S.RES ERJ2GEJ 102 X (1 kΩ)	T	68.4/24
R11	7030005090	S.RES ERJ2GEJ 104 X (100 kΩ)	T	85.5/36.7
R12	7030005530	S.RES ERJ2GEJ 100 X (10 Ω)	T	77.5/37.5
R13	7030005090	S.RES ERJ2GEJ 104 X (100 kΩ)	T	82.3/35.7
R14	7030005050	S.RES ERJ2GEJ 103 X (10 kΩ)	T	83.9/36.7
R15	7030005240	S.RES ERJ2GEJ 473 X (47 kΩ)	B	79.1/39
R16	7030004980	S.RES ERJ2GEJ 101 X (100 Ω)	B	74.8/39.9
R17	7030004970	S.RES ERJ2GEJ 470 X (47 Ω)	B	74/33.3
R18	7030005050	S.RES ERJ2GEJ 103 X (10 kΩ)	T	78.8/36.7
R19	7030005080	S.RES ERJ2GEJ 823 X (82 kΩ)	T	78.8/38.7
R20	7030005120	S.RES ERJ2GEJ 102 X (1 kΩ) [US2], [EU2], [GE2], [US2S], [EU2S], [GE2S]	B	75.9/33.7
	7030005240	S.RES ERJ2GEJ 473 X (47 kΩ) [Others]		

M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
R21	7030005110	S.RES ERJ2GEJ 224 X (220 kΩ)	T	72.2/38.9
R22	7030005050	S.RES ERJ2GEJ 103 X (10 kΩ)	T	69.2/38.9
R23	7030005110	S.RES ERJ2GEJ 224 X (220 kΩ)	T	71.2/38.9
R24	7030005050	S.RES ERJ2GEJ 103 X (10 kΩ)	T	64.6/38
R25	7030005040	S.RES ERJ2GEJ 472 X (4.7 kΩ)	B	68/37.8
R29	7030007270	S.RES ERJ2GEJ 151 X (150 Ω)	B	64.2/35.1
R30	7030005120	S.RES ERJ2GEJ 102 X (1 kΩ)	B	67.7/35.7
R31	7030004980	S.RES ERJ2GEJ 101 X (100 Ω)	B	64.2/34.1
R32	7030004980	S.RES ERJ2GEJ 101 X (100 Ω)	B	66.1/31.1
R33	7030007270	S.RES ERJ2GEJ 151 X (150 Ω)	B	55.5/25.2
R34	7030005110	S.RES ERJ2GEJ 224 X (220 kΩ)	B	52.5/25.2
R35	7030004980	S.RES ERJ2GEJ 101 X (100 Ω)	B	50.5/25.2
R36	7030007300	S.RES ERJ2GEJ 332 X (3.3 kΩ)	T	52.5/15.5
R37	7030009140	S.RES ERJ2GEJ 272 X (2.7 kΩ)	T	50.7/16.3
R38	7030005090	S.RES ERJ2GEJ 104 X (100 kΩ)	T	46.5/21
R39	7030004970	S.RES ERJ2GEJ 470 X (47 Ω)	B	55.8/22.3
R40	7030007270	S.RES ERJ2GEJ 151 X (150 Ω)	B	56.2/21.1
R43	7030004970	S.RES ERJ2GEJ 470 X (47 Ω)	B	47.5/15.4
R44	7030005090	S.RES ERJ2GEJ 104 X (100 kΩ)	B	54.8/15.4
R45	7030005070	S.RES ERJ2GEJ 683 X (68 kΩ)	B	52.8/13.7
R46	7030005000	S.RES ERJ2GEJ 471 X (470 Ω)	B	53.8/13.7
R48	7030005000	S.RES ERJ2GEJ 471 X (470 Ω)	B	51.5/25.2
R50	7030004980	S.RES ERJ2GEJ 101 X (100 Ω)	T	66.3/38
R51	7030003670	S.RES ERJ3GEYJ 823 V (82 kΩ)	B	96.5/37.3
R52	7030004990	S.RES ERJ2GEJ 221 X (220 Ω)	T	93.3/35.9
R53	7030004970	S.RES ERJ2GEJ 470 X (47 Ω)	T	80/22.5
R53	7030005530	S.RES ERJ2GEJ 100 X (10 Ω) [US2], [EU2], [GE2], [US2S], [EU2S], [GE2S]	T	80/22.5
	7030005710	S.RES ERJ2GEJ 121 X (120 Ω) [Others]		
R54	7030005060	S.RES ERJ2GEJ 333 X (33 kΩ)	T	81.3/21.4
R55	7030005040	S.RES ERJ2GEJ 472 X (4.7 kΩ)	T	80/20.9
R56	7030003860	S.RES ERJ3GE JPW V	T	78/22.4
R57	7030004970	S.RES ERJ2GEJ 470 X (47 Ω)	T	75.2/23.2
R58	7030005060	S.RES ERJ2GEJ 333 X (33 kΩ) [US3], [GE3], [US3S], [GE3S] only	T	72.1/24
R59	7030005040	S.RES ERJ2GEJ 472 X (4.7 kΩ)	T	71.2/24
R61	7030004970	S.RES ERJ2GEJ 470 X (47 Ω)	T	71.8/36.3
R62	7030005220	S.RES ERJ2GEJ 223 X (22 kΩ)	T	72.1/35
R65	7030004980	S.RES ERJ2GEJ 101 X (100 Ω)	T	69.4/34.2
R66	7030007340	S.RES ERJ2GEJ 153 X (15 kΩ)	T	67.8/34.2
R67	7030004980	S.RES ERJ2GEJ 101 X (100 Ω)	T	67.8/35.1
R68	7030005050	S.RES ERJ2GEJ 103 X (10 kΩ)	T	69.4/35.1
R69	7030005040	S.RES ERJ2GEJ 472 X (4.7 kΩ)	T	64.1/35.2
R70	7030005530	S.RES ERJ2GEJ 100 X (10 Ω)	B	57.6/40.3
R71	7030005070	S.RES ERJ2GEJ 683 X (68 kΩ)	T	58.2/38.6
R73	7030004980	S.RES ERJ2GEJ 101 X (100 Ω)	B	57.7/30.5
R75	7030005110	S.RES ERJ2GEJ 224 X (220 kΩ)	B	58.4/36.1
R76	7030004980	S.RES ERJ2GEJ 101 X (100 Ω)	B	57.6/39.3
R77	7030005050	S.RES ERJ2GEJ 103 X (10 kΩ)	B	56.7/30.5
R78	7030005090	S.RES ERJ2GEJ 104 X (100 kΩ)	T	57.8/33.3
R79	7030006020	S.RES RR0510P-682-D (6.8 kΩ)	T	56.5/39.1
R80	7030005120	S.RES ERJ2GEJ 102 X (1 kΩ) [US3], [GE3], [US3S], [GE3S]	B	54.6/32.8
	7030008370	S.RES ERJ2GEJ 561 X (560 Ω) [Others]		
R82	7030009320	S.RES ERJ2GEJ 4R7 X (4.7 Ω)	T	52.6/32
R83	7030006020	S.RES RR0510P-682-D (6.8 kΩ)	T	54.1/32.6
R84	7030006020	S.RES RR0510P-682-D (6.8 kΩ)	T	52.1/28.6
R85	7030006020	S.RES RR0510P-682-D (6.8 kΩ)	T	54.7/39.1
R86	7030005530	S.RES ERJ2GEJ 100 X (10 Ω)	B	48.2/28.8
R87	7030005110	S.RES ERJ2GEJ 224 X (220 kΩ)	B	48.1/25.3
R88	7030005010	S.RES ERJ2GEJ 681 X (680 Ω) [US3], [GE3], [US3S], [GE3S]	B	54.6/31
	7030008370	S.RES ERJ2GEJ 561 X (560 Ω) [Others]		
R89	7030005050	S.RES ERJ2GEJ 103 X (10 kΩ)	B	49.3/41.2
R90	7030005170	S.RES ERJ2GEJ 474 X (470 kΩ)	B	46.9/25.1
R92	7030005310	S.RES ERJ2GEJ 124 X (120 kΩ)	B	46.9/26.1
R93	7030005120	S.RES ERJ2GEJ 102 X (1 kΩ)	T	39.8/39.4
R94	7030005100	S.RES ERJ2GEJ 154 X (150 kΩ)	T	41.8/40.8
R95	7030005120	S.RES ERJ2GEJ 102 X (1 kΩ)	B	49.9/36.4
R96	7030008410	S.RES ERJ2GEJ 392 X (3.9 kΩ) [US2], [EU2], [GE2], [US2S], [EU2S], [GE2S]	B	49.3/40.1
	7030009140	S.RES ERJ2GEJ 272 X (2.7 kΩ) [Others]		
R97	7030005120	S.RES ERJ2GEJ 102 X (1 kΩ)	B	49.3/38.1
R98	7030007290	S.RES ERJ2GEJ 222 X (2.2 kΩ)	T	53.5/44.1
R100	7030005040	S.RES ERJ2GEJ 472 X (4.7 kΩ)	B	52.9/38.8
R101	7030005000	S.RES ERJ2GEJ 471 X (470 Ω)	B	51.4/43.3
R103	7030005240	S.RES ERJ2GEJ 473 X (47 kΩ)	T	33.1/27.8
R104	7030005230	S.RES ERJ2GEJ 334 X (330 kΩ)	T	31.5/26.9
R105	7030005170	S.RES ERJ2GEJ 474 X (470 kΩ)	T	32.6/29.1
R106	7030005050	S.RES ERJ2GEJ 103 X (10 kΩ)	T	37.5/32
R107	7030005580	S.RES ERJ2GEJ 560 X (56 Ω)	B	55.9/43.3
R108	7030005600	S.RES ERJ2GEJ 273 X (27 kΩ) [US2], [EU2], [GE2], [US2S], [EU2S], [GE2S]	T	44.9/21
	7030008290	S.RES ERJ2GEJ 183 X (18 kΩ) [Others]		
R109	7030005090	S.RES ERJ2GEJ 104 X (100 kΩ)	T	43.9/21
R110	7030005240	S.RES ERJ2GEJ 473 X (47 kΩ)	B	21.8/34.3
R111	7030005090	S.RES ERJ2GEJ 104 X (100 kΩ)	T	27.1/28.7
R113	7030006610	S.RES ERJ2GEJ 394 X (390 kΩ)	B	46.9/31.1
R114	7030005100	S.RES ERJ2GEJ 154 X (150 kΩ)	B	46.9/29.1
R115	7030007570	S.RES ERJ2GEJ 122 X (1.2 kΩ)	T	40.5/32
R116	7030007060	S.RES ERJ2GEJ 684X (680 kΩ)	T	43.4/32.7
R117	7030005040	S.RES ERJ2GEJ 472 X (4.7 kΩ)	T	35.3/40.1
R118	7030005040	S.RES ERJ2GEJ 472 X (4.7 kΩ)	T	37.2/40.1

[US2S]=F24S USA-02, [GE2S]=F24S GEN-02, [EU2S]=F25S EUR-02 S.=Surface mount
[US3S]=F24S USA-03, [GE3S]=F24S GEN-03

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
R123	7030008400	S.RES ERJ2GEJ 182 X (1.8 kΩ)	T	75.2/37.7
R124	7030005170	S.RES ERJ2GEJ 474 X (470 kΩ)	T	72.7/40.4
R125	7030005110	S.RES ERJ2GEJ 224 X (220 kΩ)	T	73.2/38.9
R131	7510001730	S.TMR ERTJOEP 473J	T	40.9/28.1
R132	7030010080	S.RES ERJ2RHD 104 X (100 kΩ)	T	40.9/27.1
R133	7030005050	S.RES ERJ2GEJ 103 X (10 kΩ)	T	84.1/14.2
R134	7030005040	S.RES ERJ2GEJ 472 X (4.7 kΩ)	T	74/14.3
R135	7030005050	S.RES ERJ2GEJ 103 X (10 kΩ)	T	24.5/24
R136	7030005040	S.RES ERJ2GEJ 472 X (4.7 kΩ)	T	22.8/24
R137	7030005050	S.RES ERJ2GEJ 103 X (10 kΩ)	T	69.8/14.7
R138	7030005040	S.RES ERJ2GEJ 472 X (4.7 kΩ)	T	69.8/16.7
R141	7030005000	S.RES ERJ2GEJ 471 X (470 Ω)	T	37/9.9
R142	7030005000	S.RES ERJ2GEJ 471 X (470 Ω)	T	43/9.9
R143	7030007340	S.RES ERJ2GEJ 153 X (15 kΩ)	T	37.2/24.4
R144	7030005050	S.RES ERJ2GEJ 103 X (10 kΩ)	B	46.5/13.7
R145	7030005090	S.RES ERJ2GEJ 104 X (100 kΩ)	T	33.4/18.1
R146	7030005090	S.RES ERJ2GEJ 104 X (100 kΩ)	T	31.6/18.1
R147	7030007350	S.RES ERJ2GEJ 393 X (39 kΩ)	T	33.4/16.1
R148	7030005080	S.RES ERJ2GEJ 823 X (82 kΩ)	T	31.6/16.1
R149	7030006610	S.RES ERJ2GEJ 394 X (390 kΩ)	T	33.4/12.9
R150	7030008300	S.RES ERJ2GEJ 184 X (180 kΩ)	T	33.4/11.9
R151	7030005030	S.RES ERJ2GEJ 152 X (1.5 kΩ)	T	33.4/13.9
R152	7030005220	S.RES ERJ2GEJ 223 X (22 kΩ)	T	31.1/29.6
R153	7030005220	S.RES ERJ2GEJ 223 X (22 kΩ)	T	29.9/29.1
R154	7030005220	S.RES ERJ2GEJ 223 X (22 kΩ)	T	28.2/30.1
R155	7030005090	S.RES ERJ2GEJ 104 X (100 kΩ)	T	29.8/41.1
R156	7030005170	S.RES ERJ2GEJ 474 X (470 kΩ)	T	29.8/40.1
R157	7030007290	S.RES ERJ2GEJ 222 X (2.2 kΩ)	T	31.5/39.1
R159	7030008010	S.RES ERJ2GEJ 123 X (12 kΩ)	T	15.7/28.8
R160	7030004980	S.RES ERJ2GEJ 101 X (100 Ω)	B	5.5/31
R161	7030005040	S.RES ERJ2GEJ 472 X (4.7 kΩ)	T	12.9/27.3
R162	7030005050	S.RES ERJ2GEJ 103 X (10 kΩ)	T	8.7/29.1
R163	7030005050	S.RES ERJ2GEJ 103 X (10 kΩ)	T	14.1/29.8
R164	7030008410	S.RES ERJ2GEJ 392 X (3.9 kΩ)	T	15.7/27.8
R165	7030008410	S.RES ERJ2GEJ 392 X (3.9 kΩ)	T	12.6/31.9
R166	7030005240	S.RES ERJ2GEJ 473 X (47 kΩ)	T	12.6/36.1
R167	7030009290	S.RES ERJ2GEJ 562 X (5.6 kΩ)	T	15.7/29.8
R168	7030005000	S.RES ERJ2GEJ 471 X (470 Ω)	T	16.3/40.1
R169	7030005100	S.RES ERJ2GEJ 154 X (150 kΩ)	T	18/41.1
R170	7030008010	S.RES ERJ2GEJ 123 X (12 kΩ)	T	12.9/29.3
R171	7030005100	S.RES ERJ2GEJ 154 X (150 kΩ)	T	11.6/36.1
R172	7030005700	S.RES ERJ2GEJ 274 X (270 kΩ)	T	18/39.1
R173	7030005310	S.RES ERJ2GEJ 124 X (120 kΩ)	T	19.4/26.8
R174	7030005090	S.RES ERJ2GEJ 104 X (100 kΩ)	T	19.4/28.8
R175	7030005110	S.RES ERJ2GEJ 224 X (220 kΩ)	T	19.4/27.8
R176	7030005100	S.RES ERJ2GEJ 154 X (150 kΩ)	T	17.7/27.8
R177	7030005060	S.RES ERJ2GEJ 333 X (33 kΩ)	T	17.7/28.8
R178	7030005710	S.RES ERJ2GEJ 121 X (120 Ω)	T	19.4/30.7
R179	7030005120	S.RES ERJ2GEJ 102 X (1 kΩ)	B	11.5/16.8
R180	7030005160	S.RES ERJ2GEJ 105 X (1 MΩ)	T	24.7/40.1
R181	7030005240	S.RES ERJ2GEJ 473 X (47 kΩ)	T	21.1/40.1
R182	7030005090	S.RES ERJ2GEJ 104 X (100 kΩ)	T	24.7/39.1
R183	7030006020	S.RES RR0510P-682-D (6.8 kΩ)	B	17.2/39.1
R184	7030008250	S.RES RR0510P-562-D (5.6 kΩ)	B	17.7/40.4
R185	7030005310	S.RES ERJ2GEJ 124 X (120 kΩ)	B	18.7/40.4
R186	7030005080	S.RES ERJ2GEJ 823 X (82 kΩ)	T	19.4/29.8
R187	7030005120	S.RES ERJ2GEJ 102 X (1 kΩ)	B	9/18.2
R190	7030007280	S.RES ERJ2GEJ 331 X (330 Ω)	T	34.7/18.9
R191	7030008300	S.RES ERJ2GEJ 184 X (180 kΩ)	T	18/4.1
R192	7030005720	S.RES ERJ2GEJ 563 X (56 kΩ)	T	18/5.1
R193	7030005220	S.RES ERJ2GEJ 223 X (22 kΩ)	T	18/6.1
R194	7030005220	S.RES ERJ2GEJ 223 X (22 kΩ)	T	23.9/10.9
R195	7030005050	S.RES ERJ2GEJ 103 X (10 kΩ)	T	19.7/4.1
R196	7030005240	S.RES ERJ2GEJ 473 X (47 kΩ)	T	23.9/11.9
R197	7030005240	S.RES ERJ2GEJ 473 X (47 kΩ)	T	23.9/12.9
R198	7030005240	S.RES ERJ2GEJ 473 X (47 kΩ)	T	25.7/12.9
R200	7030005040	S.RES ERJ2GEJ 472 X (4.7 kΩ)	T	25.7/14.9
R201	7030005240	S.RES ERJ2GEJ 473 X (47 kΩ)	T	23.9/14.9
R206	7030005110	S.RES ERJ2GEJ 224 X (220 kΩ)	T	13.4/4.1
R207	7030005090	S.RES ERJ2GEJ 104 X (100 kΩ)	T	13.4/5.1
R208	7030005240	S.RES ERJ2GEJ 473 X (47 kΩ)	T	15.6/5.1
R209	7030005220	S.RES ERJ2GEJ 223 X (22 kΩ)	T	15.6/6.1
R210	7030008010	S.RES ERJ2GEJ 123 X (12 kΩ)	T	15.6/4.1
R211	7030005070	S.RES ERJ2GEJ 683 X (68 kΩ)	T	27.1/4.1
R212	7030005070	S.RES ERJ2GEJ 683 X (68 kΩ)	T	27.1/5.1
R213	7030005070	S.RES ERJ2GEJ 683 X (68 kΩ)	T	27.1/6.1
R214	7030005070	S.RES ERJ2GEJ 683 X (68 kΩ)	T	29.1/7.1
R215	7030005070	S.RES ERJ2GEJ 683 X (68 kΩ)	T	31/6.1
R220	7030004980	S.RES ERJ2GEJ 101 X (100 Ω)	B	15.9/23.3
R221	7030005000	S.RES ERJ2GEJ 471 X (470 Ω)	B	66.5/13.7
R222	7030005080	S.RES ERJ2GEJ 823 X (82 kΩ)	B	63.9/8.5
R223	7030005060	S.RES ERJ2GEJ 333 X (33 kΩ)	B	61/11.3
R224	7030005000	S.RES ERJ2GEJ 471 X (470 Ω)	B	75.5/10.3
R225	7030004980	S.RES ERJ2GEJ 101 X (100 Ω)	B	33.9/7.1
R226	7210003061	VAR TP76N00N-15F-A103-2251A		
R227	7030005050	S.RES ERJ2GEJ 103 X (10 kΩ)	T	94.9/13.9
R228	7030005120	S.RES ERJ2GEJ 102 X (1 kΩ)	T	94.2/15.2
R229	7030005530	S.RES ERJ2GEJ 100 X (10 Ω)	T	86/9.7
R230	7030005530	S.RES ERJ2GEJ 100 X (10 Ω)	T	87.2/17.2
R231	7030005120	S.RES ERJ2GEJ 102 X (1 kΩ)	T	90.6/2.8
R232	7030007300	S.RES ERJ2GEJ 332 X (3.3 kΩ)	T	93.2/4.4
R233	7030007300	S.RES ERJ2GEJ 332 X (3.3 kΩ)	T	92.7/2.8
R234	7030005100	S.RES ERJ2GEJ 154 X (150 kΩ)	B	23.3/6.2

M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
R235	7030005090	S.RES ERJ2GEJ 104 X (100 kΩ)	B	20.3/4.2
R236	7030005230	S.RES ERJ2GEJ 334 X (330 kΩ)	B	23.3/5.2
R237	7030005050	S.RES ERJ2GEJ 103 X (10 kΩ)	T	21.1/39.1
R238	7410001140	S.ARY EXB28V104JX	B	40.9/9.5
R240	7030005590	S.RES ERJ2GEJ 680 X (68 Ω)	T	99.7/12.3
R241	7030010040	S.RES ERJ2GE-JPW	T	39.4/6.4
		[US2S], [US3S], [EU2S], [GE2S], [GE3S] only		
R242	7030010040	S.RES ERJ2GE-JPW	T	41.4/6.4
		[US2S], [US3S], [EU2S], [GE2S], [GE3S] only		
R251	7030008010	S.RES ERJ2GEJ 123 X (12 kΩ)	B	5.9/9.1
R252	7030005530	S.RES ERJ2GEJ 100 X (10 Ω)	B	13.7/9.1
R254	7030008010	S.RES ERJ2GEJ 123 X (12 kΩ)	B	9.3/10.1
R255	7030008010	S.RES ERJ2GEJ 123 X (12 kΩ)	B	7.6/10.1
R256	7030005050	S.RES ERJ2GEJ 103 X (10 kΩ)	T	6/8.6
R257	7030005120	S.RES ERJ2GEJ 102 X (1 kΩ)	T	9/22.1
R258	7410001140	S.ARY EXB28V104JX	T	6.6/20.6
R259	7030005120	S.RES ERJ2GEJ 102 X (1 kΩ)	T	21.6/22.1
R260	7030005090	S.RES ERJ2GEJ 104 X (100 kΩ)	T	21.5/25
R261	7410001130	S.ARY EXB28V102JX	T	19.4/19.9
R262	7030005090	S.RES ERJ2GEJ 104 X (100 kΩ)	T	21.3/13.9
R263	7030005050	S.RES ERJ2GEJ 103 X (10 kΩ)	T	21.3/12.9
R264	7030005240	S.RES ERJ2GEJ 473 X (47 kΩ)	T	21.3/10.9
R265	7410001130	S.ARY EXB28V102JX	T	19.7/9.2
R266	7030007340	S.RES ERJ2GEJ 153 X (15 kΩ)	T	5.7/18.8
R271	7030005160	S.RES ERJ2GEJ 105 X (1 MΩ)	B	10/39.3
R272	7030005160	S.RES ERJ2GEJ 105 X (1 MΩ)	B	11/39.3
R273	7030005160	S.RES ERJ2GEJ 105 X (1 MΩ)	B	12/39.3
R274	7030005070	S.RES ERJ2GEJ 683 X (68 kΩ)	B	15/39.3
R275	7030005090	S.RES ERJ2GEJ 104 X (100 kΩ)	B	13/39.3
R276	7030005090	S.RES ERJ2GEJ 104 X (100 kΩ)	B	8/39.3
R277	7030005090	S.RES ERJ2GEJ 104 X (100 kΩ)	B	9/39.3
R278	7030005090	S.RES ERJ2GEJ 104 X (100 kΩ)	B	14/39.3
R280	7030005050	S.RES ERJ2GEJ 103 X (10 kΩ)	B	16.2/36.2
R284	7030004980	S.RES ERJ2GEJ 101 X (100 Ω)	B	16.3/27
R287	7030007280	S.RES ERJ2GEJ 331 X (330 Ω)	T	18.4/24
R288	7030005030	S.RES ERJ2GEJ 152 X (1.5 kΩ)	T	14.7/22.7
R291	7030005090	S.RES ERJ2GEJ 104 X (100 kΩ)	B	5.9/12.5
R292	7030005090	S.RES ERJ2GEJ 104 X (100 kΩ)	B	7.6/12.5
R293	7030008290	S.RES ERJ2GEJ 183 X (18 kΩ)	T	61.4/43.4
R294	7030005600	S.RES ERJ2GEJ 273 X (27 kΩ)	T	60.4/43.4
R295	7030005240	S.RES ERJ2GEJ 473 X (47 kΩ)	B	95.1/43.4
R296	7030003490	S.RES ERJ3GEYJ 272 V (2.7 kΩ)	B	91.8/35.3
R297	7030005120	S.RES ERJ2GEJ 102 X (1 kΩ)	T	91.3/36.2
R301	7030010040	S.RES ERJ2GE-JPW	B	93.1/22.4
R302	7030004990	S.RES ERJ2GEJ 221 X (220 Ω)	T	93.3/34.9
R303	7030005040	S.RES ERJ2GEJ 472 X (4.7 kΩ)	T	33.6/20.7
C1	4030017590	S.CER ECJ0EC1H070C	B	94.2/41.5
		[US3], [GE3], [US3S], [GE3S]		
	4030017600	S.CER ECJ0EC1H080C [Others]		
C2	4030017350	S.CER ECJ0EC1H020B	B	93.2/36
		[US2], [EU2], [GE2], [US2S], [EU2S], [GE2S]		
	4030017550	S.CER ECJ0EC1H1R5B [Others]		
C3	4030017590	S.CER ECJ0EC1H070C	B	96.5/33.9
		[US3], [GE3], [US3S], [GE3S]		
	4030017600	S.CER ECJ0EC1H080C [Others]		
C4	4030017560	S.CER ECJ0EC1H2R5B	B	94.9/33.9
C5	4030017360	S.CER ECJ0EC1H030B	B	94.6/30.2
		[US3], [GE3], [US3S], [GE3S]		
	4030017570	S.CER ECJ0EC1H040B [Others]		
C6	4030017460	S.CER ECJ0EB1E102K	B	92.8/33.4
C7	4030017460	S.CER ECJ0EB1E102K	B	92.9/29.6
C8	4030017370	S.CER ECJ0EC1H3R5B	B	93.2/28.1
		[US2], [EU2], [GE2], [US2S], [EU2S], [GE2S]		
	4030017580	S.CER ECJ0EC1H060C [Others]		
C11	4030006980	S.CER C1608 CH 1H 070D-T	B	91.5/21.9
		[US2], [EU2], [GE2], [US2S], [EU2S], [GE2S]		
	4030009530	S.CER C1608 CH 1H 030B-T [Others]		
C13	4030007000	S.CER C1608 CH 1H 090D-T	B	88.3/20.8
		[US3], [GE3], [US3S], [GE3S]		
	4030007020	S.CER C1608 CH 1H 120J-T [Others]		
C14	4030017570	S.CER ECJ0EC1H040B	B	86.8/38.7
C16	4030008560	S.CER C1608 CH 1H 300J-T	B	86.4/21.5
C17	4030017510	S.CER ECJ0EC1H680J	B	83.4/38.7
C18	4030006860	S.CER C1608 JB 1H 102K-T	T	83.6/31.4
C19	4030017460	S.CER ECJ0EB1E102K	B	86/37.7
C20	4030017590	S.CER ECJ0EC1H070C	B	84.1/37.7
C21	4030017400	S.CER ECJ0EC1H220J	B	85.8/34.3
		[US3], [GE3], [US3S], [GE3S]		
	4030017410	S.CER ECJ0EC1H240J [Others]		
C22	4030017600	S.CER ECJ0EC1H080C	B	84.1/36.7
C23	4030017350	S.CER ECJ0EC1H020B	B	82/37.7
		[US3], [GE3], [US3S], [GE3S]		
	4030017560	S.CER ECJ0EC1H2R5B [Others]		
C24	4030017400	S.CER ECJ0EC1H220J	B	79.7/33.2
		[US3], [GE3], [US3S], [GE3S]		
	4030017410	S.CER ECJ0EC1H240J [Others]		
C25	4030017600	S.CER ECJ0EC1H080C	B	80.4/36.1
C27	4030017460	S.CER ECJ0EB1E102K	T	83.9/35.7
C28	4030017460	S.CER ECJ0EB1E102K	T	83.9/37.7
C30	4030017590	S.CER ECJ0EC1H070C	B	79.6/37.8
C31	4030017460	S.CER ECJ0EB1E102K	T	80.4/37.2

[US2]=USA-02, [GE2]=GEN-02, [EU2]=EUR-02, [US3]=USA-03, [GE3]=GEN-03 S.=Surface mount

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
C32	4030017460	S.CER ECJ0EB1E102K	B	75.8/39.9
C33	4030017460	S.CER ECJ0EB1E102K	T	77.1/38.7
C34	4030017420	S.CER ECJ0EC1H470J	T	77.1/39.7
C35	4030016930	S.CER ECJ0EB1A104K	T	78.8/37.7
C36	4030017460	S.CER ECJ0EB1E102K	B	71.8/33.3
C37	4030017460	S.CER ECJ0EB1E102K	B	73.4/34.2
C38	4030017350	S.CER ECJ0EC1H020B	B	74.8/37.7
		[US2], [EU2], [GE2], [US2S], [EU2S], [GE2S]		
	4030017550	S.CER ECJ0EC1H1R5B [Others]		
C39	4030017620	S.CER ECJ0EC1H100C	B	73.5/38.8
C40	4030017520	S.CER ECJ0EC1H0R3B	B	73.5/39.8
C41	4030017380	S.CER ECJ0EC1H050B	B	68.5/39.2
C42	4030017460	S.CER ECJ0EB1E102K	T	68.5/37.7
C43	4030017460	S.CER ECJ0EB1E102K	T	70.2/38.9
C44	4030017340	S.CER ECJ0EC1H010B	B	69/37.8
		[US2], [EU2], [GE2], [US2S], [EU2S], [GE2S]		
	4030017550	S.CER ECJ0EC1H1R5B [Others]		
C45	4030017620	S.CER ECJ0EC1H100C	B	72.2/38.8
		[US3], [GE3], [US3S], [GE3S]		
	4030017630	S.CER ECJ0EC1H120J [Others]		
C46	4030017460	S.CER ECJ0EB1E102K	T	68.2/38.9
C48	4030017400	S.CER ECJ0EC1H220J	B	64.2/37.2
C49	4030017350	S.CER ECJ0EC1H020B	B	64.2/40
		[US3], [GE3], [US3S], [GE3S]		
	4030017380	S.CER ECJ0EC1H050B [Others]		
C50	4030017460	S.CER ECJ0EB1E102K	B	64.2/36.1
C51	4030017460	S.CER ECJ0EB1E102K	B	66.1/32.1
C52	4030017420	S.CER ECJ0EC1H470J	B	66.1/35.7
C53	4030016790	S.CER ECJ0EB1C103K	B	64.2/33.1
C54	4030017460	S.CER ECJ0EB1E102K	B	64.2/32.1
C56	4030017400	S.CER ECJ0EC1H220J	B	64.3/24.4
C57	4030017460	S.CER ECJ0EB1E102K	T	64.1/36.8
C58	4030017460	S.CER ECJ0EB1E102K	B	53.9/24.3
C59	4030017460	S.CER ECJ0EB1E102K	B	49.5/25.2
C60	4030017460	S.CER ECJ0EB1E102K	B	52.5/26.9
C61	4030017430	S.CER ECJ0EC1H101J	B	49.5/22.7
C62	4030017680	S.CER ECJ0EC1H820J	B	47.5/17.6
C63	4030017420	S.CER ECJ0EC1H470J	B	46.5/20.7
C64	4030016790	S.CER ECJ0EB1C103K	T	49.7/16.3
C65	4030017460	S.CER ECJ0EB1E102K	B	46.5/18.9
C66	4030017460	S.CER ECJ0EB1E102K	B	47.5/13.7
C67	4030017460	S.CER ECJ0EB1E102K	B	53.9/22.3
C68	4030017440	S.CER ECJ0EC1H221J	B	51.8/13.7
C69	4030017730	S.CER ECJ0EB1E471K	B	53.8/15.4
C70	4030017730	S.CER ECJ0EB1E471K	B	54.8/13.7
C71	4030016930	S.CER ECJ0EB1A104K	B	56.2/17.5
C72	4030017420	S.CER ECJ0EC1H470J	T	69.8/18.7
C73	4030017460	S.CER ECJ0EB1E102K	T	69.3/24
C74	4030017460	S.CER ECJ0EB1E102K	T	93.3/37
C75	4550005980	S.TAN TEESVA 1A 475M8L	B	54.5/9.9
C76	4030016790	S.CER ECJ0EB1C103K	T	66.7/21.1
C77	4030017460	S.CER ECJ0EB1E102K	T	65.7/22.7
C78	4030017460	S.CER ECJ0EB1E102K	T	74.8/20.8
C79	4030018890	S.CER ECJ0EB0J224K	T	72.3/21.1
C80	4030017780	S.CER ECJ0EB1E472K	T	68/18.7
C81	4030016790	S.CER ECJ0EB1C103K	B	77.2/21.5
C82	4030017460	S.CER ECJ0EB1E102K	B	78.2/21.5
C83	4030017620	S.CER ECJ0EC1H100C	T	81.3/22.3
		[US3], [GE3], [US3S], [GE3S]		
	4030017400	S.CER ECJ0EC1H220J [Others]		
C84	4030017420	S.CER ECJ0EC1H470J	T	81.3/20.5
C86	4030017420	S.CER ECJ0EC1H470J	T	78.7/24.3
		[US2], [EU2], [GE2], [US2S], [EU2S], [GE2S]		
	4030017650	S.CER ECJ0EC1H270J [Others]		
C88	4030017460	S.CER ECJ0EB1E102K	T	73.1/24
C89	4030017570	S.CER ECJ0EC1H040B	T	75.5/24.4
		[US2], [EU2], [GE2], [US2S], [EU2S], [GE2S]		
C91	4510004650	S.ELE ECEV1EA4R7SR	B	69.7/20.3
C92	4030017630	S.CER ECJ0EC1H120J	T	74.6/30.9
C93	4030017380	S.CER ECJ0EC1H050B	T	70.9/33.5
		[US2], [EU2], [GE2], [US2S], [EU2S], [GE2S]		
	4030017600	S.CER ECJ0EC1H080C [Others]		
C94	4030017730	S.CER ECJ0EB1E471K	T	70.3/24
C96	4030017460	S.CER ECJ0EB1E102K	T	73.8/36
		[US3], [GE3], [US3S], [GE3S] only		
C97	4030017420	S.CER ECJ0EC1H470J	T	74.8/36
C98	4030017380	S.CER ECJ0EC1H050B	T	66.1/33.9
		[US2], [EU2], [GE2], [US2S], [EU2S], [GE2S]		
	4030017620	S.CER ECJ0EC1H100C [Others]		
C99	4030017460	S.CER ECJ0EB1E102K	T	68.3/36.3
C100	4030017620	S.CER ECJ0EC1H100C	B	61.3/36.1
C102	4030017380	S.CER ECJ0EC1H050B	T	59.5/34.3
C103	4030017350	S.CER ECJ0EC1H020B	B	58.2/35.1
C104	4030017460	S.CER ECJ0EB1E102K	T	58.9/29.4
C105	4030017460	S.CER ECJ0EB1E102K	B	58.6/37.1
C106	4030017420	S.CER ECJ0EC1H470J	B	70.3/33.9
C107	4030017460	S.CER ECJ0EB1E102K	T	70.6/36.3
C108	4030016790	S.CER ECJ0EB1C103K	T	69.7/36.3
C109	4030017460	S.CER ECJ0EB1E102K	B	57.6/41.3
C110	4030017730	S.CER ECJ0EB1E471K	B	55.7/30.5
C111	4030017420	S.CER ECJ0EC1H470J	B	56.3/34.4
C112	4030017460	S.CER ECJ0EB1E102K	T	60.2/38.6
C113	4030017520	S.CER ECJ0EC1H0R3B	T	56.1/32.6

M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
C114	4030017360	S.CER ECJ0EC1H030B [US3], [GE3], [US3S], [GE3S]	T	51.9/36.5
	4030017580	S.CER ECJ0EC1H060C [Others]		
C115	4030017570	S.CER ECJ0EC1H040B [US3], [GE3], [US3S], [GE3S]	T	55.7/35.7
	4030017630	S.CER ECJ0EC1H120J [Others]		
C116	4030016790	S.CER ECJ0EB1C103K	T	56.5/37.9
C117	4030017730	S.CER ECJ0EB1E471K	T	56.5/36.9
C118	4030017530	S.CER ECJ0EC1H0R5B	T	56.1/33.9
C119	4030017460	S.CER ECJ0EB1E102K	T	56.6/31.6
C120	4030017730	S.CER ECJ0EB1E471K	T	57.5/28.7
C121	4030017380	S.CER ECJ0EC1H050B [US3], [GE3], [US3S], [GE3S]	T	52.6/30
	4030017630	S.CER ECJ0EC1H120J [Others]		
C122	4030017570	S.CER ECJ0EC1H040B [US3], [GE3], [US3S], [GE3S]	T	53.1/28.6
	4030017620	S.CER ECJ0EC1H100C [Others]		
C123	4030017390	S.CER ECJ0EC1H180J [US2], [EU2], [GE2], [US2S], [EU2S], [GE2S]	T	52.6/31
	4030017640	S.CER ECJ0EC1H150J [Others]		
C124	4030017580	S.CER ECJ0EC1H060C [US3], [GE3], [US3S], [GE3S]	T	51.1/29
	4030017610	S.CER ECJ0EC1H090C [Others]		
C126	4030017630	S.CER ECJ0EC1H120J	T	52/37.7
C127	4030017380	S.CER ECJ0EC1H050B [US3], [GE3], [US3S], [GE3S]	T	50.5/37.5
	4030017600	S.CER ECJ0EC1H080C [Others]		
C129	4030017530	S.CER ECJ0EC1H0R5B	T	48.4/31.4
C130	4030016950	S.CER ECJ0EB1A473K	B	49.3/39.1
C132	4030017460	S.CER ECJ0EB1E102K	B	46.9/27.1
C133	4030017630	S.CER ECJ0EC1H120J [US3], [GE3], [US3S], [GE3S]	T	51.1/31
	4030017640	S.CER ECJ0EC1H150J [Others]		
C134	4030017630	S.CER ECJ0EC1H120J [US3], [GE3], [US3S], [GE3S]	T	50.5/36.3
	4030017640	S.CER ECJ0EC1H150J [Others]		
C135	4030017460	S.CER ECJ0EB1E102K	T	48.4/34.4
C136	4030016930	S.CER ECJ0EB1A104K	T	48.4/35.4
C137	4030016790	S.CER ECJ0EB1C103K	T	57.7/44.1
C138	4030017460	S.CER ECJ0EB1E102K	B	49.6/28.4
C139	4030016930	S.CER ECJ0EB1A104K	B	56.7/28.9
C140	4030016930	S.CER ECJ0EB1A104K	T	43.4/34.7
C141	4030017460	S.CER ECJ0EB1E102K	B	50.1/42.4
C142	4030017460	S.CER ECJ0EB1E102K	T	42.9/21
C143	4030017460	S.CER ECJ0EB1E102K	B	52/42.3
C144	4030017420	S.CER ECJ0EC1H470J	B	49.6/29.3
C145	4030017420	S.CER ECJ0EC1H470J	B	47.1/23.9
C146	4550000270	S.TAN TEESVA 1E 474M8L	B	52.6/32.7
C147	4550000460	S.TAN TEESVA 1C 105M8L	B	47.5/41.4
C148	4550006250	S.TAN TEESVA 1A 106M8L	T	50.1/44.1
C149	4030017460	S.CER ECJ0EB1E102K	T	43.8/39.1
C150	4030018860	S.CER ECJ0EB0J105K	T	43.9/22.7
C151	4030016930	S.CER ECJ0EB1A104K	T	40.2/40.8
C152	4030017420	S.CER ECJ0EC1H470J	T	35.3/41.1
C153	4030017420	S.CER ECJ0EC1H470J	T	37.2/41.1
C154	4030017420	S.CER ECJ0EC1H470J	T	38/39.1
C155	4030017420	S.CER ECJ0EC1H470J	T	43.8/38.1
C156	4030017460	S.CER ECJ0EB1E102K	T	39.5/32
C157	4030017620	S.CER ECJ0EC1H100C	T	38.5/32
C158	4030016930	S.CER ECJ0EB1A104K	T	36.1/31.4
C159	4030017460	S.CER ECJ0EB1E102K	T	36.1/32.4
C160	4030016930	S.CER ECJ0EB1A104K	B	20.2/33.7
C161	4030017620	S.CER ECJ0EC1H100C	T	43.4/33.7
C162	4030017500	S.CER ECJ0EC1H560J	T	43.9/28.1
C163	4030017570	S.CER ECJ0EC1H040B	T	42.5/27.6
C164	4030017590	S.CER ECJ0EC1H070C	T	43.9/27.1
C165	4030016790	S.CER ECJ0EB1C103K	T	43.4/31.7
C166	4030017360	S.CER ECJ0EC1H030B	T	43.2/24.7
C167	4030016930	S.CER ECJ0EB1A104K	B	55.8/23.3
C168	4030016930	S.CER ECJ0EB1A104K	B	56.6/19.8
C169	4030016930	S.CER ECJ0EB1A104K	B	56.6/18.8
C170	4030017460	S.CER ECJ0EB1E102K	T	91.5/34.2
C171	4030017420	S.CER ECJ0EC1H470J	T	91.5/35.2
C173	4030017460	S.CER ECJ0EB1E102K	T	82.3/37.3
C175	4030017360	S.CER ECJ0EC1H030B [US2], [EU2], [GE2], [US2S], [EU2S], [GE2S]	B	97.1/41.5
	4030017560	S.CER ECJ0EC1H2R5B [Others]		
C176	4030017460	S.CER ECJ0EB1E102K	T	77.7/20.4
C177	4030009910	S.CER C1608 CH 1H 040B-T	B	90.7/33.4
C178	4030017420	S.CER ECJ0EC1H470J	T	77.7/21.3
C179	4030006860	S.CER C1608 JB 1H 102K-T	T	86.6/31.4
C180	4030017460	S.CER ECJ0EB1E102K	T	67.1/32.3
C182	4030017590	S.CER ECJ0EC1H070C [US3], [GE3], [US3S], [GE3S]	T	68.8/31.6
	4030017600	S.CER ECJ0EC1H080C [Others]		
C183	4030017420	S.CER ECJ0EC1H470J	T	74.1/24
C185	4030017530	S.CER ECJ0EC1H0R5B	B	90.7/35.7
C186	4030017530	S.CER ECJ0EC1H0R5B	B	92.1/38.7
C188	4030017460	S.CER ECJ0EB1E102K	B	47.5/20.7
C202	4030016930	S.CER ECJ0EB1A104K	T	48.4/33.4
C203	4030017460	S.CER ECJ0EB1E102K	B	46.9/30.1
C205	4030017380	S.CER ECJ0EC1H050B	B	56.3/39.7
C206	4030017590	S.CER ECJ0EC1H070C	B	55.9/41.3

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
C208	4030017590	S.CER ECJ0EC1H070C	B	54.2/42.3
C209	4030017460	S.CER ECJ0EB1E102K	B	54.2/43.3
C211	4030018910	S.CER C1608 JB 0J 475K-T	T	36.1/21.9
C213	4030017460	S.CER ECJ0EB1E102K	T	31.5/27.8
C221	4030016930	S.CER ECJ0EB1A104K	T	32.3/31.6
C222	4030016930	S.CER ECJ0EB1A104K	T	19.2/34
C223	4030016930	S.CER ECJ0EB1A104K	B	29.7/9
C224	4030016930	S.CER ECJ0EB1A104K	T	40.9/29.1
C225	4030017460	S.CER ECJ0EB1E102K	B	83/11.6
C226	4550005980	S.TAN TEESVA 1A 475M8L	B	81.2/13.5
C227	4030016790	S.CER ECJ0EB1C103K	B	86.9/13
C228	4510004630	S.ELE ECEV1CA100SR	B	89.4/15.7
C229	4030017460	S.CER ECJ0EB1E102K	B	85.8/17.8
C230	4030016930	S.CER ECJ0EB1A104K	B	85.8/16.8
C231	4030016790	S.CER ECJ0EB1C103K	T	74/13.3
C232	4030016930	S.CER ECJ0EB1A104K	T	76.2/13.3
C233	4030016790	S.CER ECJ0EB1C103K	T	24.5/23
C234	4030017460	S.CER ECJ0EB1E102K	T	24.2/27.8
C235	4030016790	S.CER ECJ0EB1C103K	T	69.8/15.7
C236	4030017460	S.CER ECJ0EB1E102K	T	69.8/17.7
C237	4510005430	S.ELE ECEV0JA220SR	B	76/15.5
C238	4030017460	S.CER ECJ0EB1E102K	B	77/18.4
C241	4030016930	S.CER ECJ0EB1A104K	T	35.4/9.9
C242	4030016930	S.CER ECJ0EB1A104K	T	44.7/9.9
C243	4030016790	S.CER ECJ0EB1C103K	T	40.5/9.9
C244	4030016930	S.CER ECJ0EB1A104K	B	46.5/15.4
C251	4030016970	S.CER ECJ0EB1C223K	T	33.4/17.1
C252	4030017740	S.CER ECJ0EB1E821K	T	29.9/16.1
C253	4030017740	S.CER ECJ0EB1E821K	T	33.4/14.9
C254	4030016930	S.CER ECJ0EB1A104K	T	33.4/10.9
C255	4030016950	S.CER ECJ0EB1A473K	B	34.5/12.1
C256	4030016940	S.CER ECJ0EB1A393K	T	29.9/28.1
C257	4030016930	S.CER ECJ0EB1A104K	T	29.9/30.1
C258	4030017790	S.CER ECJ0EB1E682K	T	26.6/30.1
C259	4030018860	S.CER ECJ0EB0J105K	T	31.5/41.1
C260	4030017730	S.CER ECJ0EB1E471K	T	29.8/39.1
C261	4030016930	S.CER ECJ0EB1A104K	T	31.5/40.1
C264	4510004630	S.ELE ECEV1CA100SR	B	69.7/15.5
C265	4030017460	S.CER ECJ0EB1E102K	B	65/12.9
C266	4030016930	S.CER ECJ0EB1A104K	B	62.3/8.5
C269	4030017720	S.CER ECJ0EB1H331K	T	11.6/37.9
C270	4030016950	S.CER ECJ0EB1A473K	T	14.1/28.8
C271	4030016950	S.CER ECJ0EB1A473K	T	14.1/26.8
C272	4030016950	S.CER ECJ0EB1A473K	T	10.6/28.5
C273	4030016950	S.CER ECJ0EB1A473K	T	14.1/27.8
C274	4030016950	S.CER ECJ0EB1A473K	T	11.6/31.9
C275	4030016970	S.CER ECJ0EB1C223K	T	11.6/34.4
C276	4030016950	S.CER ECJ0EB1A473K	T	12.6/34.4
C277	4030016930	S.CER ECJ0EB1A104K	T	14.6/40.1
C278	4030017430	S.CER ECJ0EC1H101J	T	18/40.1
C279	4030018910	S.CER C1608 JB 0J 475K-T	T	36.9/23.2
C280	4030017780	S.CER ECJ0EB1E472K	T	21.3/27.8
C281	4030018920	S.CER ECJ0EB1H392K	T	17.7/26.8
C282	4030017710	S.CER ECJ0EC1H181J	T	17.7/29.8
C283	4030018900	S.CER ECJ0EB0J474K	T	19.4/31.7
C284	4030016930	S.CER ECJ0EB1A104K	T	22.9/39.1
C285	4030016930	S.CER ECJ0EB1A104K	T	22.9/40.1
C286	4030017460	S.CER ECJ0EB1E102K	B	16.7/40.4
C287	4550006250	S.TAN TEESVA 1A 106M8L	B	21.8/40.7
C288	4030017460	S.CER ECJ0EB1E102K	B	17.2/38.1
C289	4030016930	S.CER ECJ0EB1A104K	B	20.2/31
C290	4030016930	S.CER ECJ0EB1A104K	T	27.5/16.2
C291	4030016780	S.CER ECJ0EB1C153K	T	25.7/10.9
C292	4030016930	S.CER ECJ0EB1A104K	T	25.7/13.9
C293	4030017740	S.CER ECJ0EB1E821K	T	25.7/11.9
C295	4030018110	S.CER ECJ0EB1H272K	T	29.1/5.1
C296	4030018240	S.CER ECJ0EB1E562K	T	29.1/6.1
C297	4030017710	S.CER ECJ0EC1H181J	T	27.1/7.1
C298	4030018090	S.CER ECJ0EB1C822K	T	31/7.1
C299	4030017510	S.CER ECJ0EC1H680J	T	31/5.1
C300	4030017450	S.CER ECJ0EB1E271K	B	19.8/38.2
C302	4030017620	S.CER ECJ0EC1H100C	T	66/39.3
C303	4030017460	S.CER ECJ0EB1E102K	T	65/39.3
C304	4030017580	S.CER ECJ0EC1H060C	B	68.5/40.2
C305	4030017580	S.CER ECJ0EC1H060C	B	64.2/41
C306	4030017460	S.CER ECJ0EB1E102K	B	61/12.3
C307	4030017460	S.CER ECJ0EB1E102K	B	59.3/12.3
C308	4030017460	S.CER ECJ0EB1E102K	T	75.7/9.8
C309	4030017460	S.CER ECJ0EB1E102K	B	75.5/11.3
C310	4030016930	S.CER ECJ0EB1A104K	T	21.3/11.9
C311	4030017460	S.CER ECJ0EB1E102K	B	64.9/8.5
C312	4030017420	S.CER ECJ0EC1H470J	B	75/6.1
C313	4030017420	S.CER ECJ0EC1H470J	B	32.9/7.1
C314	4030017460	S.CER ECJ0EB1E102K	T	86.6/3.3
C315	4030017460	S.CER ECJ0EB1E102K	T	93.2/6
C316	4030016930	S.CER ECJ0EB1A104K	T	91.7/2.8
C317	4510004630	S.ELE ECEV1CA100SR	B	95.9/15.2
C318	4030016930	S.CER ECJ0EB1A104K	T	89.7/8.9
C319	4030016930	S.CER ECJ0EB1A104K	T	89.6/2.8
C320	4030017730	S.CER ECJ0EB1E471K	T	88.6/2.8
C321	4030017460	S.CER ECJ0EB1E102K	B	19.3/4.2
C322	4030016950	S.CER ECJ0EB1A473K	T	93.9/13.9
C323	4030016950	S.CER ECJ0EB1A473K	T	87.6/9.7

[US2S]=F24S USA-02, [GE2S]=F24S GEN-02, [EU2S]=F25S EUR-02 S.=Surface mount
[US3S]=F24S USA-03, [GE3S]=F24S GEN-03

M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
C324	4030017420	S.CER ECJ0EC1H470J	T	85/13.7
C325	4550006250	S.TAN TEESVA 1A 106M8L	T	90.6/17.2
C326	4510006940	S.ELE EEVFC0J101P	B	87.8/8.9
C333	4030017420	S.CER ECJ0EC1H470J	B	76.8/39.9
C335	4030018860	S.CER ECJ0EB0J105K	B	57.2/21.1
C339	4030016930	S.CER ECJ0EB1A104K	B	5.9/17.2
C340	4030016930	S.CER ECJ0EB1A104K	B	9.3/12.5
C341	4030016930	S.CER ECJ0EB1A104K	B	5.9/10.1
C342	4030017630	S.CER ECJ0EC1H120J	B	18.3/4.2
C343	4030017580	S.CER ECJ0EC1H060C	B	5.6/4.2
C344	4030017640	S.CER ECJ0EC1H150J	B	7.6/9.1
C345	4030016930	S.CER ECJ0EB1A104K	B	11/11.2
C346	4030016930	S.CER ECJ0EB1A104K	B	11/10.1
C347	4030016790	S.CER ECJ0EB1C103K	T	8.8/6.5
C348	4030016930	S.CER ECJ0EB1A104K	T	6/10
C349	4030016930	S.CER ECJ0EB1A104K	T	21.3/14.9
C350	4030017460	S.CER ECJ0EB1E102K	T	59.4/43.4
C354	4030017460	S.CER ECJ0EB1E102K	T	14.2/24.4
C355	4030018080	S.CER ECJ0EB1H182K	T	42.9/22.7
C356	4030018910	S.CER C1608 JB 0J 475K-T	T	35.3/20.6
C357	4030017400	S.CER ECJ0EC1H220J	T	79/25.5
J1	6510021900	S.CNR BM02B-ASRS-TF	T	86.6/6.8
J2	6450001680	CNR HSJ1122-010010		
J3	6450002250	CNR HSJ1456-010320		
J4	6510018430	S.CNR AXN330C038P	B	11.8/30.6
J5	6510021900	S.CNR BM02B-ASRS-TF [US2S], [US3S], [EU2S], [GE2S], [GE3S] only	T	50.4/11.7
F1	5210000830	S.FUS ERBFE3R00U	T	98/14.5
DS1	5040002670	S.LED CL-165HR/YG	T	102.8/12.4
MC1	7700002540	MIC SKP-4538		
S1	2260002840	SW SKHLLFA010		
S2	2260002800	S.SW SW-167 (SKQTLAE010)	B	99.4/44.2
S3	2260002800	S.SW SW-167 (SKQTLAE010)	B	60.9/44.2
S4	2250000490	ECR TP70TF5163-15.9F-2775 [US2], [US3], [EU2], [GE2], [GE3] only		
EP1	6910015370	S.BEA ACZ1005Y-102-T	T	57/29.9
EP2	0910057942	PCB B 6161B		
EP3	6910015370	S.BEA ACZ1005Y-102-T	T	34.7/32

[CHASSIS UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
J1	6910015910	CNR ANT CONNECTOR-104		
J2	6910015860	CNR IMSA-6277S-02A-G		
S1	2260002870	SW AS-243-A13 [US2S], [US3S], [EU2S], [GE2S], [GE3S] only		
SP1	2510001060	SP K036NA500-47		
W1	8900009640	CBL OPC-963		
W2	8900009640	CBL OPC-963 [US2S], [US3S], [EU2S], [GE2S], [GE3S] only		

[ANT UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
L601	6200008240	S.COL 0.30-0.9-5TL 14N	B	7.2/12.5
C601	4030017600	S.CER ECJ0EC1H080C	B	5.8/15.3
EP601	0910057920	PCB B 6210		

[CONNECT UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
C501	4030017460	S.CER ECJ0EB1E102K	T	18.3/15.3
C502	4030016930	S.CER ECJ0EB1A104K	T	9.3/15.3
J501	6910016390	CNR IMSA-9230B-1-02Z145-PT1		
EP501	0910057930	PCB B 6160		

S.=Surface mount

SECTION 7 MECHANICAL PARTS AND DISASSEMBLY

7-1 CABINET PARTS

[MAIN UNIT]

REF.	ORDER. NO.	DESCRIPTION	QTY.
J2	6450001680	HSJ1122010010	1
J3	6450002250	HSJ1456-010320	
R226	7210003061	TP76N00N-15F-A103-2251A	1
S1	2260002840	SKHLLFA010	1
S4	2250000490	TP70TF5163-15.9F-2775 [F24S], [F25S] only	1
MP4	8510016580	2775 shield plate	1
MP5	8510016770	2776 earth plate	1
MC1	7700002540	SKP-4538	1

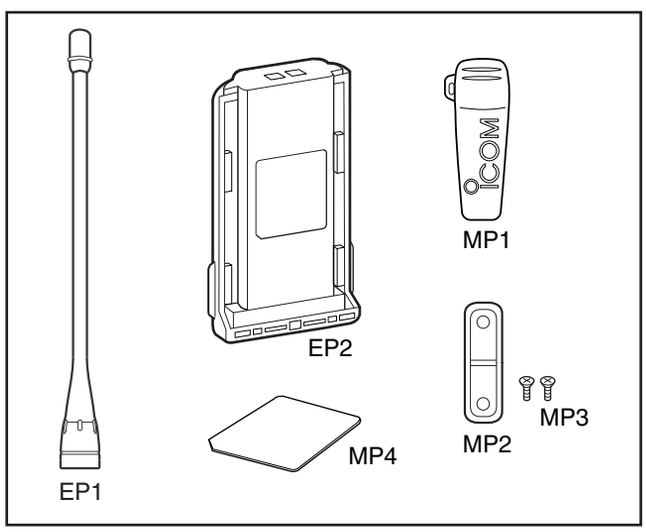
[CHASSIS PARTS]

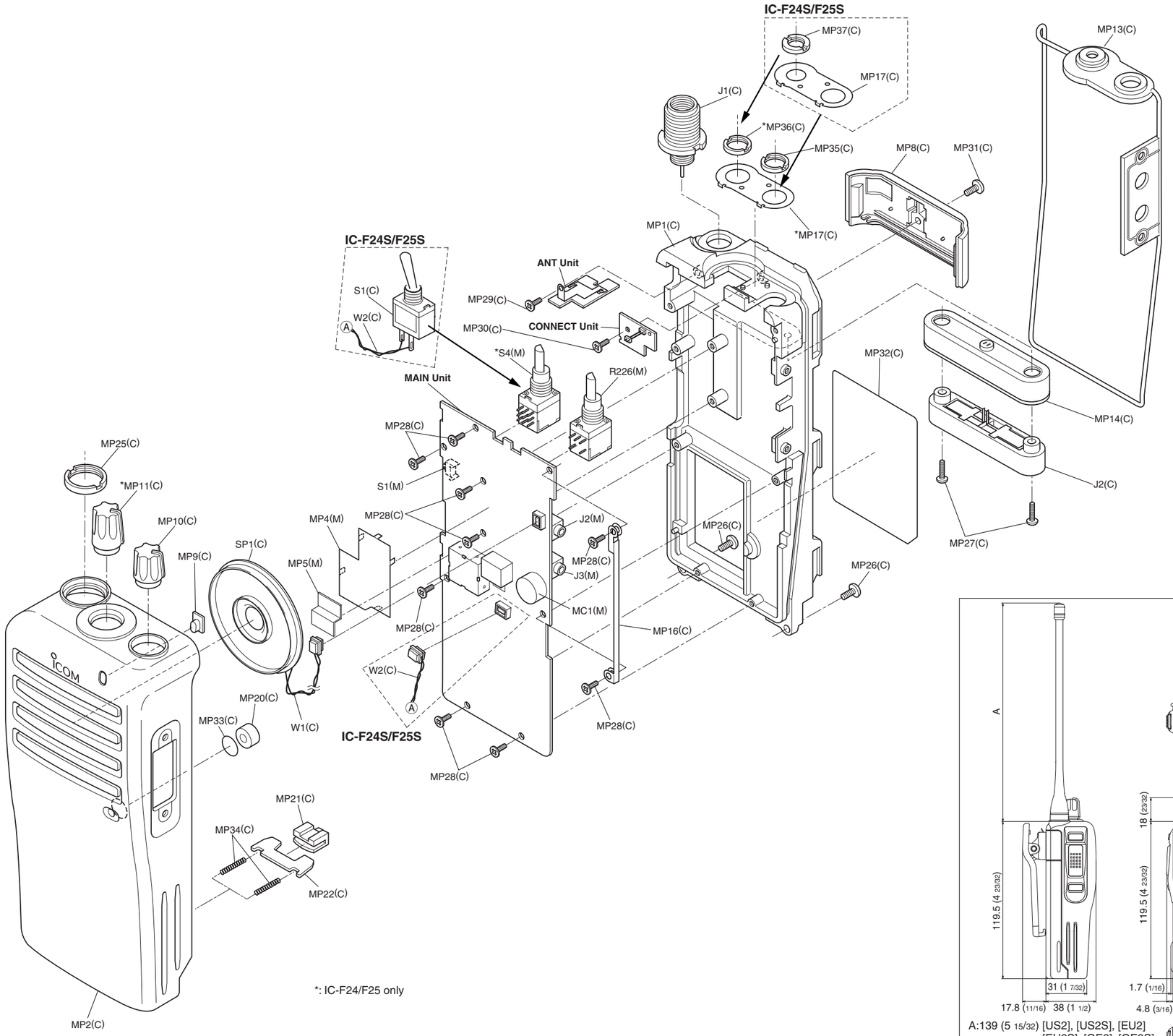
REF.	ORDER. NO.	DESCRIPTION	QTY.
S1	2260002870	AS-243-A13 [F24S], [F25S]only	1
SP1	2510001060	K036NA500-47	1
W1	8900009640	OPC-963	1
W2	8900009640	OPC-963 [F24S], [F25S]only	1
J1	6910015910	Antenna connector-104	1
J2	6910015860	IMSA-6277S-02A-G	1
MP1	8010019690	2775 chassis	1
MP2	8210020920	2775 front panel	1
MP8	8210020550	2721 rear panel	1
MP9	8930063350	2775 lens	1
MP10	8610011930	Knob N-318	1
MP11	8610012130	Knob N-323 [F24], [F25]	1
MP13	8930063330	2775 B-main seal [F24], [F25]	1
	8930063330	2775 A-main seal [F24S], [F25S]	1
MP14	8930063060	2721 terminal rubber	1
MP16	8930063400	2775 side plate	1
MP17	8930063410	2775 B-top plate [F24], [F25]	1
	8930063410	2775 A-top plate [F24S], [F25S]	1
MP20	8930043760	1923 mic seal	1
MP21	8930059360	2600 release button	1
MP22	8930063390	2775 release plate	1
MP25	8830001720	2721 antenna nut	1
MP26	8810009220	Scerw B0 2 x 8 ZK (BT)	2
MP27	8810009560	Scerw M2 x 6 ZK	2
MP28	8810009510	Scerw M2 x 4 NI-ZU (BT)	9
MP29	8810009510	Scerw M2 x 4 NI-ZU (BT)	1
MP30	8810009510	Scerw M2 x 4 NI-ZU (BT)	1
MP31	8810010160	Scerw M3 x 5 SUS ZK	1
MP32	8930051290	2251 opt sheet	1
MP33	8930042350	1922 mic sheet	1
MP34	8930056540	Spring (AH)	2
MP35	8830001700	VR nut (Q)	1
MP36	8830001700	VR nut (Q)	1
MP37	8830001740	VR nut (S) [F24S], [F25S]only	1

Screw abbreviations B0, BT: Self-tapping
ZK: Black
SUS: Stainless
NI-ZU: Nickel-zinc

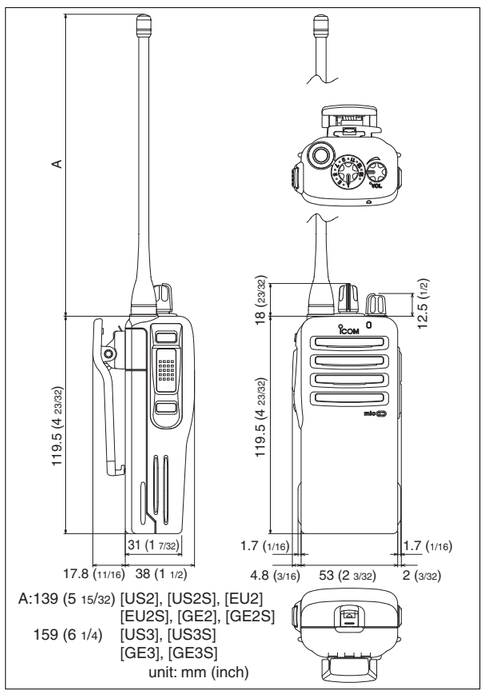
[ACCESSORIES]

REF.	ORDER. NO.	DESCRIPTION	QTY.
EP1	3310002311	FA-SC25U-1 [US2], [US2S], [EU2] [EU2S], [GE2], [GE2S]	1
	3310002291	FA-SC57U-1 [US3], [US3S] [GE3], [GE3S]	1
EP2	0800007541	BP-231 ACC-1	
MP1	8010019540	MB-94 ACC	1
MP2	8210020560	2721 JACK PANEL	1
MP3	8810004860	Screw M2 x 6 ZK	2
MP4	8930051290	2251 opt sheet	1





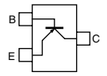
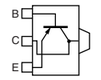
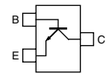
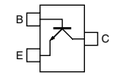
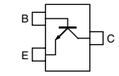
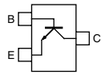
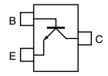
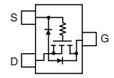
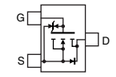
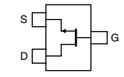
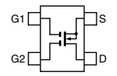
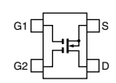
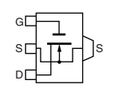
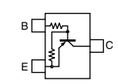
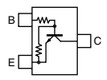
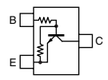
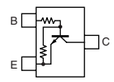
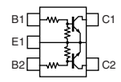
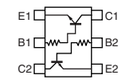
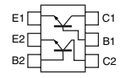
*: IC-F24/F25 only



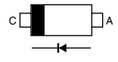
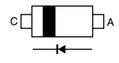
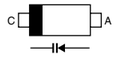
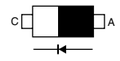
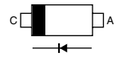
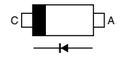
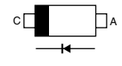
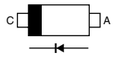
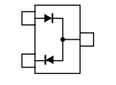
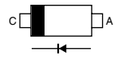
UNIT abbreviation (C): CHASSIS PARTS, (M): MAIN UNIT

SECTION 8 SEMI-CONDUCTOR INFORMATION

• TRANSISTORS AND FETs

2SA2048TL R (Symbol: UL) 	**2SB1132 R** (Symbol: BARB) 	**2SC3356 R25** (Symbol: R25) 	**2SC4116 BL** (Symbol: LL) 	**2SC4215 O** (Symbol: QO) 
2SC4226 R25 (Symbol: BR) 	**2SC5107 O** (Symbol: MFO) 	**2SK1829** (Symbol: K1) 	**2SK3019** (Symbol: KN) 	**2SK880 Y** (Symbol: XY) 
3SK293 (Symbol: UF) 	**3SK299 U73** (Symbol: U73) 	**RD01MUS1** (Symbol: K2) 	**RD07MVS1** (Symbol: RD07MVS1) 	**UNR9113J** (Symbol: 6C) 
UNR911HJ (Symbol: 6P) 	**UNR9210J** (Symbol: 8L) 	**UNR9213J** (Symbol: 8C) 	**XP1214** (Symbol: 9H) 	**XP4216** (Symbol: 8U) 
XP6501 AB (Symbol: 5N) 				

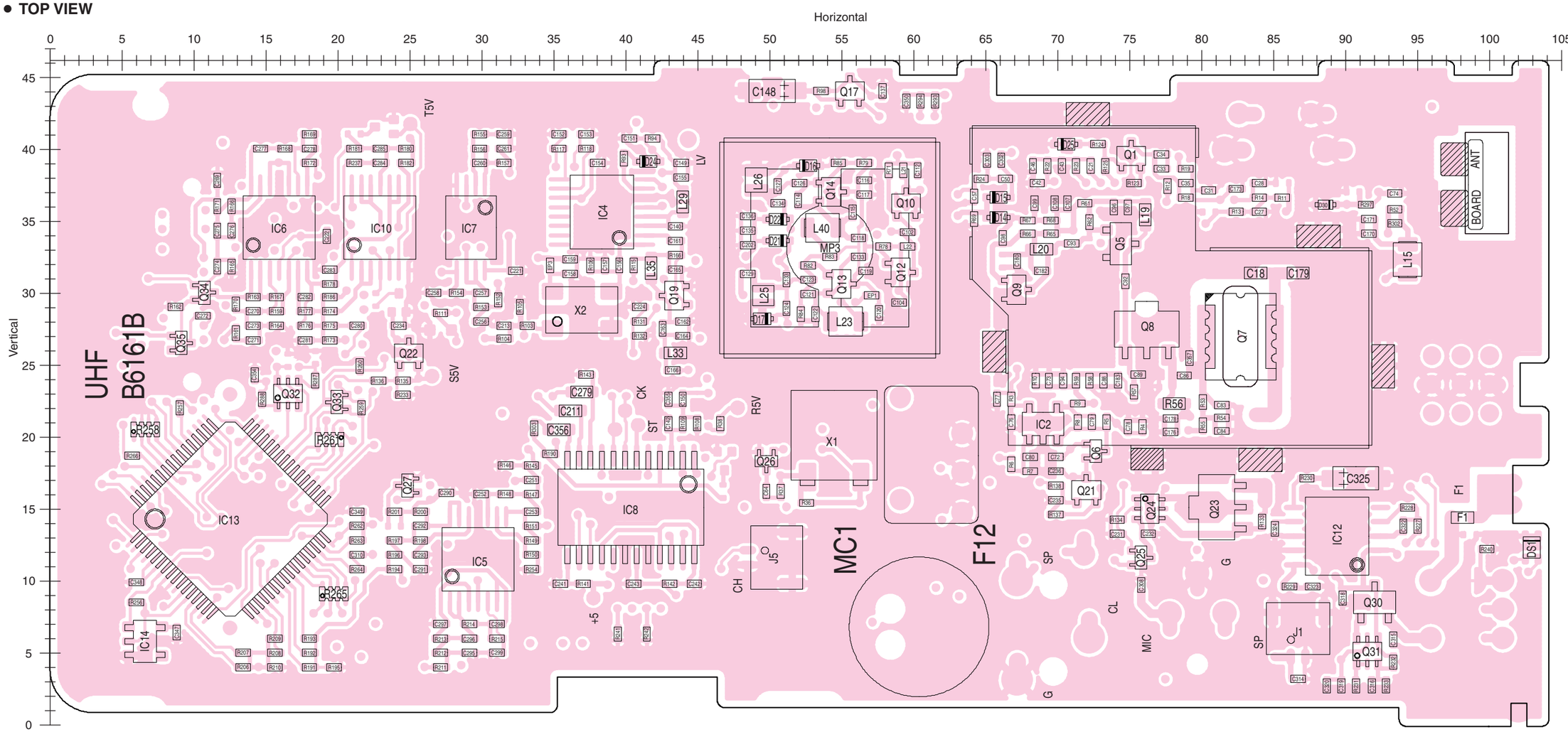
• DIODES

1SS400 (Symbol: A) 	**1SV307** (Symbol: TX) 	**DAN222** (Symbol: N) 	**HVC350B** (Symbol: B0) 	**MA368** (Symbol: 6L) 
MA8043 L (Symbol: 4_3) 	**MA2S077** (Symbol: S) 	**MA2S111** (Symbol: A) 	**MA2S728** (Symbol: B) 	**RB876W TL** (Symbol: 3X) 
RB886G (Symbol: C) 				

SECTION 9 BOARD LAYOUTS

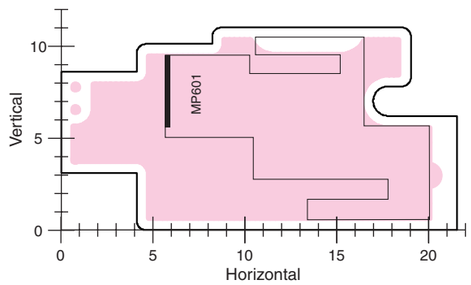
9-1 MAIN UNIT

- **TOP VIEW**



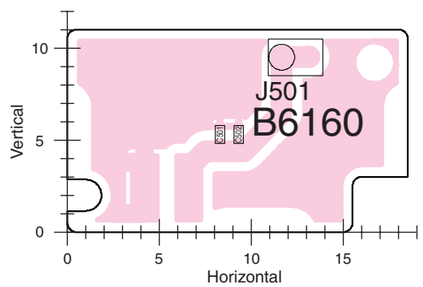
9-2 ANT UNIT

- **TOP VIEW**

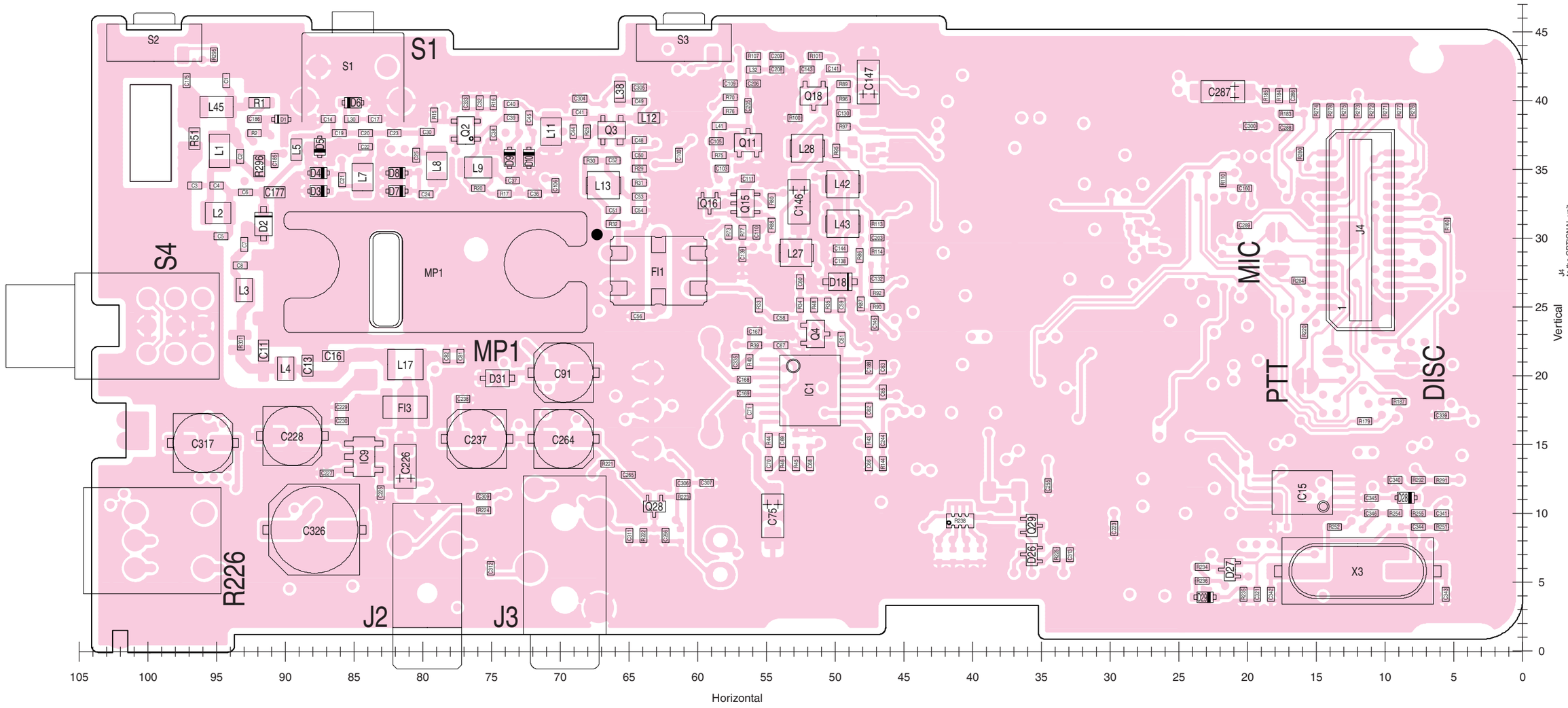


9-3 CONNECT UNIT

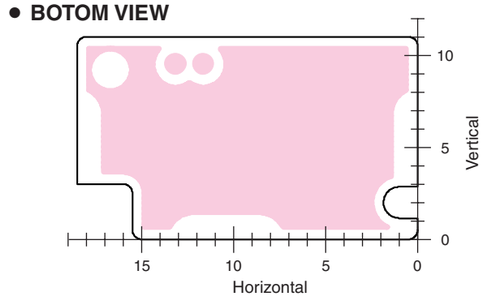
- **TOP VIEW**



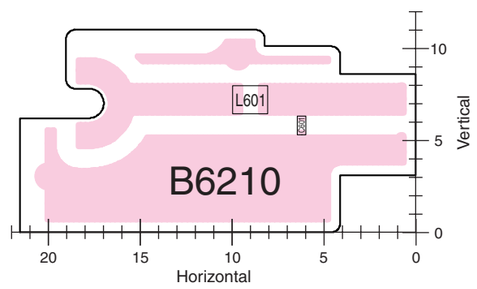
● **BOTTOM VIEW**



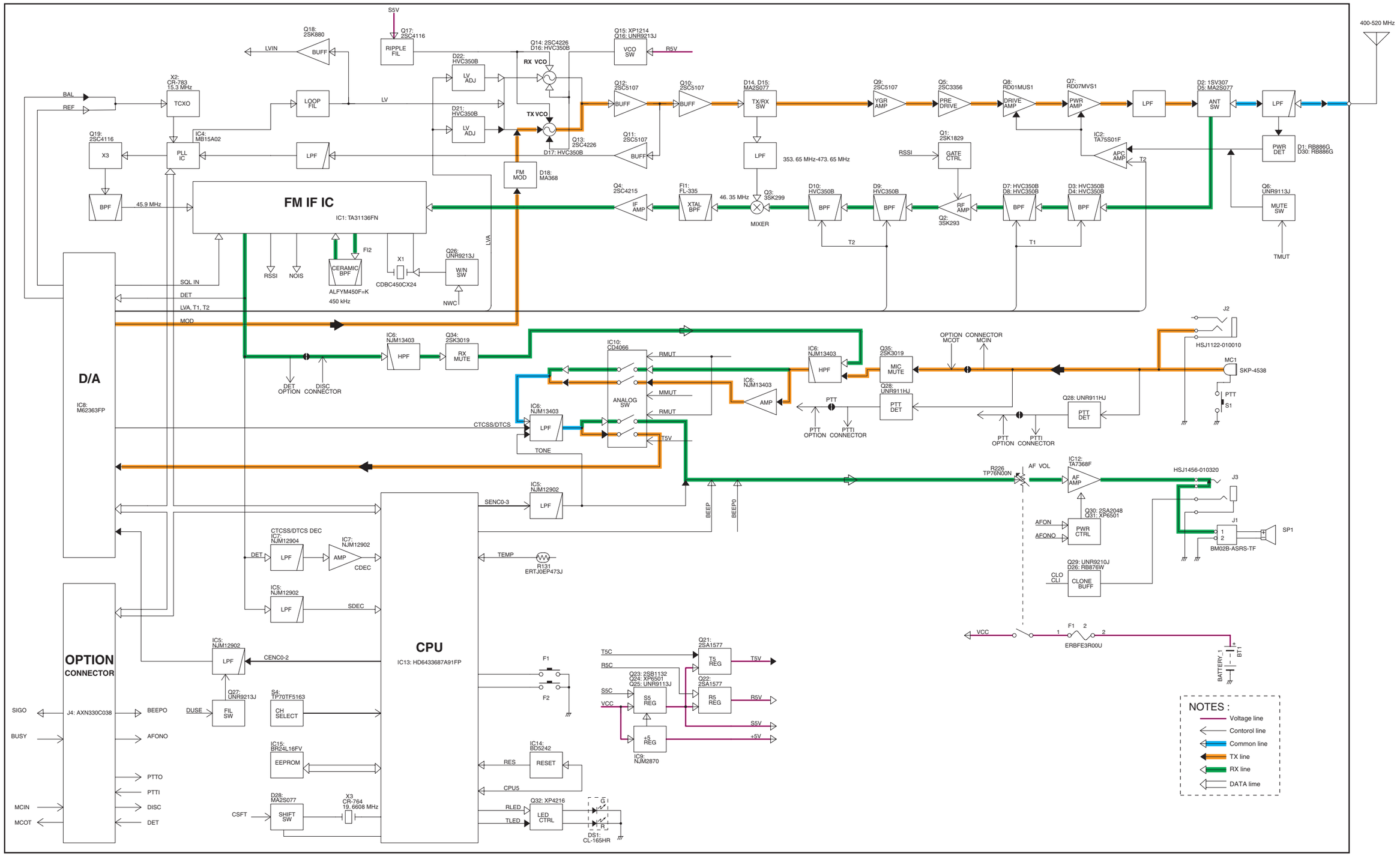
● **BOTOM VIEW**



● **BOTOM VIEW**

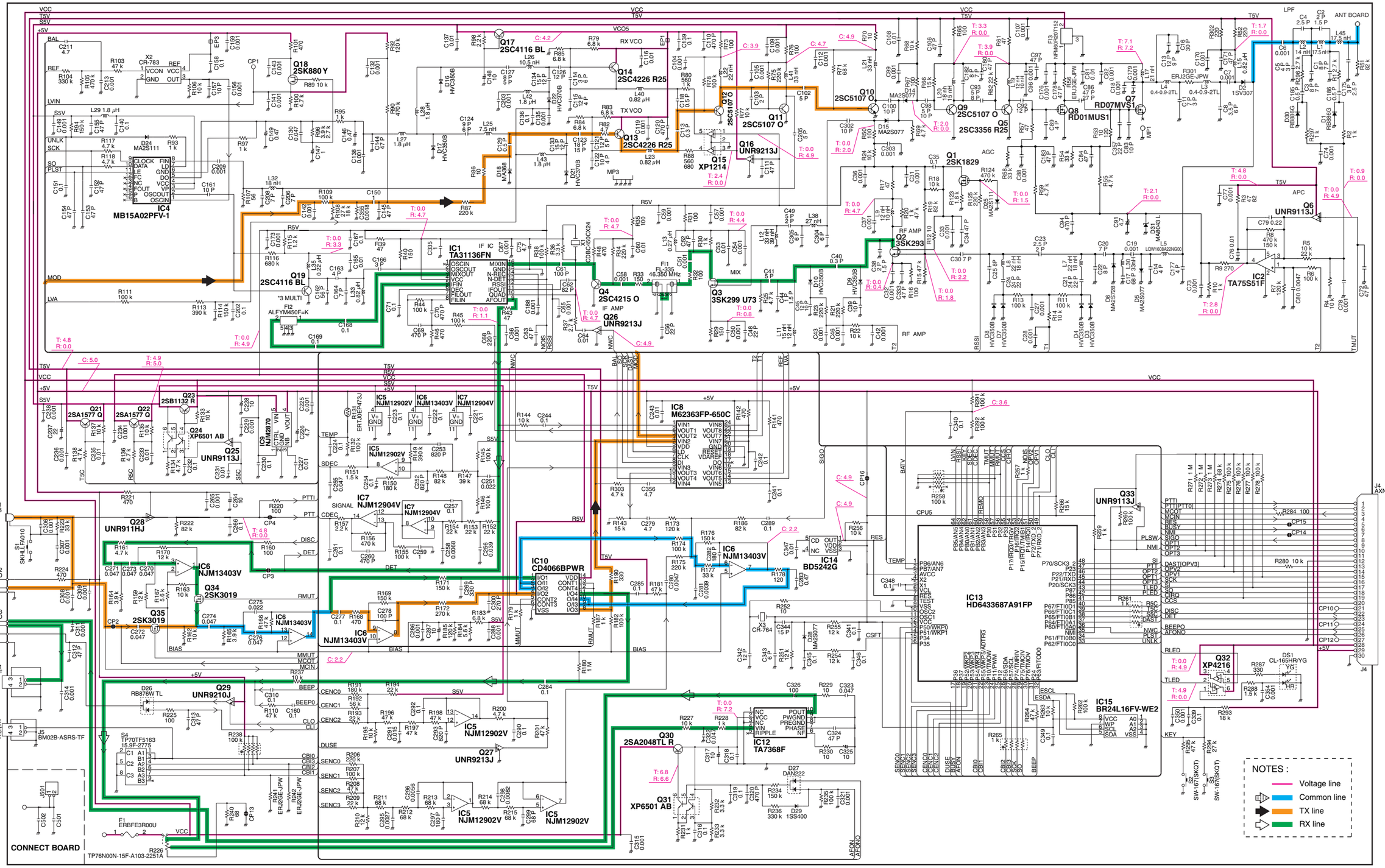


SECTION 10 BLOCK DIAGRAM



SECTION 11 VOLTAGE DIAGRAM

11-1 MAIN UNIT



Icom Inc.

1-1-32, Kamiminami, Hirano-ku, Osaka 547-0003, Japan
Phone : +81 (06) 6793 5302
Fax : +81 (06) 6793 0013
URL : http://www.icom.co.jp/world/index.html

Icom America Inc.
<Corporate Headquarters>
2380 116th Avenue N.E., Bellevue, WA 98004, U.S.A.
Phone : +1 (425) 454-8155 Fax : +1 (425) 454-1509
URL : http://www.icomamerica.com
E-mail : sales@icomamerica.com
<Customer Service>
Phone : +1 (425) 454-7619

Icom Canada
Glenwood Centre #150-6165
Highway 17 Delta, B.C., V4K 5B8, Canada
Phone : +1 (604) 952-4266 Fax : +1 (604) 952-0090
URL : http://www.icomcanada.com
E-mail : info@icomcanada.com

Icom (Australia) Pty. Ltd.
A.B.N. 88 006 092 575
290-294 Albert Street, Brunswick, Victoria, 3056, Australia
Phone : +61 (03) 9387-0666 Fax : +61 (03) 9387-0022
URL : http://www.icom.net.au
E-mail : sales@icom.net.au

Icom New Zealand
146A Harris Road, East Tamaki,
Auckland, New Zealand
Phone : +64 (09) 274 4062 Fax : +64 (09) 274 4708
URL : http://www.icom.co.nz
E-mail : inquiries@icom.co.nz

Beijing Icom Ltd.
1305, Wanshang Plaza, Shijingshan Road, Beijing China
Phone : +86 (010) 6866 6337 Fax : +86 (010) 6866 3553
URL : http://www.bjicom.com
E-mail : bjicom@bjicom.com

Icom (Europe) GmbH
Communication Equipment
Himmelgeister Str. 100, D-40225 Dűsseldorf, Germany
Phone : +49 (0211) 346047 Fax : +49 (0211) 333639
URL : http://www.icomeurope.com
E-mail : info@icomeurope.com

Icom Spain S.L
Crta. de Gracia a Manresa Km. 14,750
08190 Sant Cugat del Valles Barcelona, SPAIN
Phone : +34 (93) 590 26 70 Fax : +34 (93) 589 04 46
URL : http://www.icomspain.com
E-mail : icom@icomspain.com

Icom (UK) Ltd.
Unit 9, Sea St., Herne Bay, Kent, CT6 8LD, U.K.
Phone : +44 (01227) 741741 Fax : +44 (01227) 741742
URL : http://www.icomuk.co.uk
E-mail : info@icomuk.co.uk

Icom France S.a
Zac de la Plaine, 1, Rue Brindejonc des Moulinais
BP 5804, 31505 Toulouse Cedex, France
Phone : +33 (5) 61 36 03 03 Fax : +33 (5) 61 36 03 00
URL : http://www.icom-france.com
E-mail : icom@icom-france.com

Asia Icom Inc.
6F No.68, Sec. 1 Cheng-Teh Road, Taipei, Taiwan, R.O.C.
Phone : +886 (02) 2559 1899 Fax : +886 (02) 2559 1874
URL : http://www.asia-icom.com
E-mail : sales@asia-icom.com

Icom Polska
Sopot, 3 Maja 54 Poland
Phone : +48 (58) 550 7135 Fax : +48 (58) 551 0484
E-mail : icompolska@icompolska.com.pl

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Icom Inc.
1-1-32, Kamiminami, Hirano-ku, Osaka, 547-0003, Japan

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